The Builder.

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Model By-laws for Rural Districts.

NEARLY a generation after the passing of the Public Health Act (1875) the Local Government Board has awakened to the fact that there is a radical difference between Urban and Rural districts, and that by-laws which may be reasonably enforced in towns will be unduly onerous in the country. Rural District Councils have been aware of this, and with comparatively few exceptions have done without by-laws altogether rather than adopt the stringent clauses which the Local Government Board has hitherto considered necessary. In the recently-issued "Model by-laws as to new buildings and certain matters in connexion with buildings in rural districts," the Board shows a spirit of compromise which can scarcely fail to gain the sympathy of Rural Authorities.

The new model by-laws are "confined to matters affecting health," and do not, indeed, deal with matters of this kind in a harsh or exhaustive manner. They contain no clauses as to the stability of buildings, the prevention of fire, and the level, width, and construction of new streets, and do not even specify the height of rooms which are to be used for human habitation. In the main, the new series consists of a selection of clauses from the old model by-laws, but some idea of the simplification which has been effected will be gathered from the fact that the number of by-laws in the new series is only fifty-one, while in the old or urban series it is exactly 100.

By-law No. 1 contains interpretations of various terms such as "public building," "domestic building," &c., and, as far as it goes, is similar to the corresponding urban by-law.

No. 2 specifies the buildings which shall be exempt from the operation of the by-laws, and contains nine clauses, eight of which tally with the urban exemptions. Three clauses of the urban by-law are, however, omitted, and a new clause is inserted which has the effect of excluding from the operation of the by-laws all buildings which are not public buildings, or buildings of the warehouse class, or dwelling-houses. Thus, to quote the words of the official memorandum accompanying the by-laws, "the erection of buildings for agricultural purposes, and out-buildings such as a plant house, orchard house, summer house, poultry house, tool house, &c., is wholly unrestricted, except that they should not encroach on the open space required to be provided for new domestic buildings." Pigsties and cowsheds, however, are not exempt unless they are detached from a dwelling-house. Stables are not mentioned, but we gather from the wording of the clause and of the memorandum that they are exempt whether attached to a dwelling-house or not.

Only three by-laws are devoted to "the structure of walls and foundations." The first (No. 3) specifies that the site of a "new domestic building" must be covered with asphalt or concrete "wherever the dampness of the site or the nature of the soil renders such a precaution necessary." The sentence within inverted commas does not appear in the corresponding urban by-law. No. 4 requires a damp-course to be laid beneath the level of the lowest *floor* (not "timbers," as in the older by-laws) in every wall of "a new *public* building *or a new dwelling-house.*" The italicised words are new, and have the effect of excluding buildings of the warehouse class, the outbuildings of houses, &c., from the operation of the by-law. Two new clauses deal with the construction of walls of rooms below the level of the ground, and stipulate that such walls shall be impervious to moisture or double. If the latter method is adopted, there must be a cavity 2½ in. wide between the two parts of the wall and extending from the base to a height of 6 in. above the ground; the two parts must be tied together with "suitable and sufficient ties" of iron, stoneware, &c., and must have damp-courses at the base and at the level of the top of the cavity. No. 5 completes the regulations as to the walls by specifying that parapets must be properly coped or otherwise protected to prevent dampness. Not a word is said as to the materials of which walls above ground must be built, and, consequently, wood, brick, stone, concrete, and other materials may be used; the thickness of the walls is also left to the discretion of the builder.

The clauses relating to the air-space in the front of buildings are much less onerous than the corresponding clauses of the old series. Between the fronts of *domestic buildings* on opposite sides of a street there must be a space at least 24 ft. wide; in the case of a building of this class "intended to front on a street laid out before the confirmation of these by-laws and of a less width than 24 ft.," the front of the building must be set back at least 12 ft. from the centre of the street. This is an equitable adjustment between the owners of the ground on opposite sides of the street. There is no obligation to increase the width of the roadway to 24 ft., but the space may be utilised as a garden or yard or for the erection of a portico, porch, step, &c., and may be enclosed by a gate, fence, or wall not more than 7 ft. high. The by-law relates only to *domestic buildings*; public buildings and buildings of the warehouse class do not fall within its scope.

The same remark applies to the next by-law (No. 7), which fixes the space in the rear of "a new domestic building" at not less than 150 square feet. The distance across this space "from every part of such building to the boundary of any lands or premises immediately opposite or adjoining the site of such building" must be in every part at least 15 ft.; but if the height of the building is 25 ft. the distance must be at least 20 ft.; and if the height is 35 ft. or more, the distance must be at least 25 ft. No building may be erected on this space except a water-closet, earth-closet or privy, and an

ashpit. Many Urban Authorities which have adopted the older model by-laws (containing almost identical provisions) have found it necessary to allow a coal-place also to be erected on this space, and we think that this permission ought to be explicitly granted in the new by-laws. A still greater objection may be taken to the clause as it now stands. In provincial towns and villages back streets or passages are almost invariably found, and have the great advantage of facilitating drainage as well as the removal of ashes and the contents of earth-closets and privies. In such places the adoption of the older model by-laws has at once led to friction between architects or builders and the authorities. The space required in the rear of an ordinary two-storied cottage, and "exclusively belonging to such building," must be at least 15 ft. wide; the back street between the two open spaces must be 36 ft. wide; and we thus get a total width of 66 ft. between the backs of opposite rows of cottages. Obviously, this is excessive, and authorities have almost invariably had the mortification of having to break their by-laws as soon as adopted. Generally a total width of 36 ft. between the backs of buildings has been adopted as the minimum, and of this a portion from 12 ft. to 15 ft. wide has been allotted to the back street midway between the buildings. Some provision of this kind might with advantage have been inserted in the new by-laws.

The ventilation of buildings is dealt with in By-laws 8 to 12, which agree very closely with Nos. 55 to 59 of the old series. The only important alteration is that the clauses relating to the sizes and openings of windows are now confined to new *domestic* buildings, and not, as in No. 57 of the earlier by-laws, to new buildings generally. The area of the aperture or air-shaft provided for the ventilation of a habitable room without fireplace has also been reduced from 100 to 50 sq. in.

Nos. 13 to 18 are concerned with the drainage of buildings, and provide for sub-soil drainage "wherever necessary," and for the mode of construction and ventilation of drains. Drains are to be laid in a bed of concrete "where necessary" only; the depth of drains under buildings is not now specified, but adequate means of *access* must be provided at both ends of such drains, the word "access" being now substituted for "ventilation." An intercepting trap must be placed in every sewage drain near the point of connexion with the "sewer or other means of discharge," and the drain must be ventilated by means of two openings—one at or near the surface of the ground, and the other at least 10 ft. above the ground—except as follows:—1. No ventilation whatever is required for a drain not more than 20 ft. long if the drain does not serve a water-closet "within the building"; and 2, the opening for ventilation at or near the surface of the ground may be dispensed with if the drain is not more than 30 ft. long and does not serve a water-closet which has "internal communication with any building."

The waste-pipes from slop-sinks (No. 19) must be treated generally as soil-pipes, but the diameter of such waste-pipes is not specified. Soil-pipes may now be $3\frac{1}{2}$ in. in diameter instead of 4 in. Waste-pipes from baths, kitchen-sinks, and lavatories must be trapped and must discharge over channels leading to trapped gullies, but the length of such channels is now not stated. This is an advantage.

The provisions with regard to water-closets, earth-closets, and privies have been altered and improved. Earth-closets are now classed with privies, and not with water-closets, and may not be placed within a building. Windows are not required in water-closets which are not "within a building," but a sufficient opening for "lighting and ventilation" must be provided in each case. By a new by-law, the occupier of any premises is made responsible for the supply of a sufficient quantity of water for flushing the closet in his occupation.

In the earlier by-laws it was specified that privies must be at least 6 ft. from any habitable building. This distance is now increased to 10 ft., and must be adhered to in the case of earth-closets as well as privies. Earth-closets and privies (see Nos. 25 to 32) must be constructed alike, and may have either fixed or movable receptacles for filth. According to By-law 29, both earth-closets and privies must be provided with "suitable means or apparatus for the frequent and effectual application of dry earth or other deodorising substance, or of ashes, dust, or dry refuse," to any filth deposited in the receptacles. From these by-laws it would appear that there is now no distinction recognised between earth-closets and privies; but the explanatory memorandum shows that what is meant by an earth-closet is a closet in which dry earth (not ashes or other refuse) is used to cover the deposits. There can be no doubt whatever that earth-closets are seldom kept in proper condition; tenants are, as a rule, too careless to provide a supply of dry earth, and the closets become merely privies. Where, however, a Rural District Council is prepared to undertake the supply of dry earth, or can show that facilities for obtaining it exist, by-laws dealing with earth-closets apart from privies (on the lines of the older model by-laws) will be sanctioned by the Local Government Board. The only other alteration to which attention need be drawn is the increase of the size of a *fixed* receptacle for filth from 8 to 12 cubic feet.

The by-laws relating to ashpits (Nos. 33 to 38) differ from the urban model in only two important respects. They must be at least 10 ft. from a habitable building (an increase of 4 ft.), and may have a capacity of 20 cubic feet instead of 6. The latter alteration is designed to allow the accumulation of a month's refuse instead of the week's accumulation allowed for in the urban by-laws. Cesspools (Nos. 39 to 42) are regulated as before, with the exception of alternative methods of construction being provided for. By-law 43, dealing with the closing of buildings unfit for human habitation, is similar in all respects to the Urban By-law No. 90, and the remaining by-laws, which treat of the deposit of plans and sections, the giving of notices, the inspection and reconstruction of work, penalties, &c., are merely altered to exclude the laying-out and construction of streets, and the materials used in the erection of buildings, from the operation of the by-laws.

It will be gathered from this summary that the Local Government Board has gone a long way towards meeting the objections of Rural Authorities to the older model by-laws. Indeed, in the matter of the space between the fronts of new domestic buildings, we think they have gone too far. A space only 24 ft. wide is too little, and the cost of building would be only very slightly increased if a width of 30 or 36 ft. were required. The additional space could be utilised for gardens, and, judging from the case of urban districts where the model by-laws have been adopted, we believe that the building owner would not have to pay a penny for the extra land, while the vendor would still be able to charge a price considerably in excess of its agricultural value.

That the erection of buildings in at least some parts of rural districts ought to be regulated, all sanitarians are agreed; and the new model by-laws are on the whole so reasonable, that many Rural District Councils which would have nothing to do with the old urban series will probably adopt them. It may be mentioned that by-laws may be made for a part of a rural district, but this part should be "very clearly defined by a well-recognised boundary-line." Of course, if a Council wishes to adopt more stringent by-laws for the whole or part of its district, there is nothing to prevent this being done; and as in many districts there are portions which are of a decidedly urban character, it will often be necessary to regulate the width of new streets and the materials to be used in the erection of buildings.

NOTES.

The City of London and Control of the Streets.

THE Corporation of the City of London will apply to Parliament in the course of next Session for leave to bring in a Bill that shall confer upon them new and further powers with respect to the breaking up of and interference with streets in the City of London and the Liberties. They seek also to obtain a more thorough control over the various persons—including the Postmaster-General—who have statutory or special powers of opening and breaking up the thoroughfares. The Bill will provide that not less than two months' notice, together with plans, sections, &c., shall be given before any work of that kind is begun; that a certain period shall elapse before such operations are renewed in the same street, and that the works shall be executed during such times of the day or night, or day and night, and in such order or sequence, as the Corporation may, under penalty, require. The Corporation desire further to make by-laws affecting the removal of house-refuse and its deposit by occupiers each morning in approved receptacles upon the pavement, and the demolition of buildings with its attendant dust, dirt, nuisance, and noise.

The Workmen's Compensation Act.

THE decision of the Court of Appeal in the case of Veazey *v.* Chattle puts a finishing touch to the criticism on this statute. The question raised was really one of fact, which a sensible layman was just as capable of deciding as a trained lawyer, namely, whether a crawling-board was a scaffold. The Court decided that it was, for the reason that it was assumed that the Legislature could not have intended to do anything so foolish as exclude a workman from compensation simply because a crawling-board was not in common parlance a scaffold. This board, said the Master of the Rolls, fulfilled the

purpose of repair just as well as an actual scaffold. It was a kind of platform, and as the Court ought not to narrow down the statute more than was possible, the board should be regarded as scaffolding within the meaning of the Act. Whether this last decision will cause the Home Secretary to take in hand an amending Act we know not, but there can be no question that the recent course of decisions has shown more strongly than ever the urgent need of eliminating the unjust and tiresome exceptions in this Act, which are not only the cause of litigation, but often work the grossest injustice.

A Gas Testing Question.

THE South Metropolitan Gas Company do not like the existing methods employed by the gas examiners of the London County Council for testing the quality of the Company's gas, and have given notice that they intend to introduce a Bill during the next Session of Parliament, to, among other things, abolish the present system of testing in favour of the testing arrangements prescribed by the Gasworks Clauses Act, 1871. Under the present system the gas examiners may test the gas for illuminating power at any hour of the day or night, but under the Gasworks Clauses Act the tests may only be conducted between certain hours in the evening. In the Gasworks Clauses Act no provision is made for testing the quantities of ammonia and of sulphur compounds, other than sulphuretted hydrogen, present in the gas; but under the existing arrangements the quantities of these impurities are estimated every day. If the gas is always of good quality, why object to the testing? Even if the testing necessitates the expenditure of a few thousand pounds per annum, this sum is insignificant in comparison with the sum which might be saved by the company, at the expense of the consumers, by systematically supplying gas of lower quality than it ought to be. The testing of a commodity does not necessarily indicate suspicion of the honesty of the vendor; it is a common-sense business precaution. The existing system of testing is prescribed by three gas referees, who are impartial experts of high scientific reputation appointed by the Board of Trade, and are quite competent to perform the duties they have undertaken. We have consistently advocated the supply of a cheap low-grade gas in preference to a costly high-grade gas, but whatever the quality of the gas it must be rigorously tested, and the most suitable reply which the consumers of South London can make to the present proposition of the gas company is to agitate for the addition of a calorific power test and a carbon monoxide test to the present series of tests prescribed by law.

Electric Traction on Railways.

MR. LANGDON, in his presidential address to the Institution of Electrical Engineers last week, stated several of the problems which have to be solved before electricity can displace steam in railway working. As Mr. Langdon is an electrician who has had unrivalled experience in railway working owing to the many years he has been associated with the Midland Railway, his address deserves careful study. He is convinced that sooner or later electricity will displace steam. He recommends railway companies to attack the problem at once, and equip electrically a portion of their lines so as to find out experimentally the most suitable system. Failure to do this will probably lead to the construction of fast electric railways parallel to their lines with disastrous results. Although Manchester and Liverpool are connected by three lines of railway, yet the proposed electric line on a mono-rail system joining them has received Parliamentary sanction. The capital invested in electric railways is 1,300,000,000*l.*, and the wholesale depreciation of such a vast sum would be a national calamity. The total weight of a modern steam locomotive and tender exceeds a hundred tons, and the tendency of the day is to make them larger and heavier, so that the speed of passenger trains and the load on goods trains may be increased. This involves a greater stress on the permanent way, and the impact on bridges and other structures over which the vehicles pass is often excessive. Two electric locomotives, or, better still in our opinion, a train made up of carriages each containing its own motors, would distribute the weight better, and would be welcomed by the engineer of the line. The reason Mr. Langdon gave for his preference of the electric locomotive was that the locomotive system would be equally suited for both goods and passenger traffic. In railway working a great loss is occasioned by the shunting of heavy goods trains going at the rate of twenty miles an hour to let the express trains pass. If we shortened the goods trains and ran them by electric locomotives at forty miles an hour, we could double the capacity of the line. Mr. Langdon stated that an overhead electrical service was inadmissible on main lines. He was probably thinking of a railway equipped with direct current where the great weight of the conductors required would make the expense of putting them overhead prohibitive. With three-phase high-tension currents we think two light overhead trolley wires might be most advantageously employed.

Telephone Competition.

WHEN the Post Office proposed two years ago to start a telephone service in London, we welcomed the scheme, naturally thinking that the competition with the National Telephone Company would lower the rates and lead to a more efficient service. Two millions of the country's money has been sunk in the undertaking, and the Post Office was granted full powers to dig up the streets to lay their elaborate conduits. Considering that the National Telephone Company has to pay 10 per cent. of their gross receipts to the Government, and that it has to pay a dividend on a very inflated capital, it was not surprising that the public should have expected a substantial reduction of the rates. Apparently, however, the public derives no advantage at all from the new service. At present any one joining the Post Office system will have to wait longer at his telephone before he can get connected through to any of the company's subscribers than if he subscribed to the company. He will have to be connected to the company's exchange through the medium of the Post Office exchange, and he will gain nothing by this delay. It seems to us that it would have been far better for the nation to have purchased the National Telephone Company's undertaking on a reasonable valuation than turn the Post Office into a branch establishment of the company, managed by officials who until a few months ago were on the staff of the Company. We hope that the agitation against the unreasonable tariff of the Post Office will lead to a lowering of the rates. The inhabitants of London put up very patiently during the last two years with the obstruction to traffic caused by the laying of the elaborate P.O. conduits. It seems hardly equitable that they should have to pay nearly a hundred per cent. more than the inhabitants of Glasgow do for their municipal service. The failure of the Post Office to compete with the Company has grievously disappointed the business people of London.

Multiplex Telegraphy.

IT is known to electricians that when we have an alternating and a direct current flowing in a wire each produces its own heating effect just as if the other were not there. For example, the heating of a wire carrying a current of 10 ampères direct and 10 ampères alternating is only half that produced by 20 ampères direct or 20 ampères alternating. To a certain extent direct and alternating currents in a wire seem to ignore one another's presence. This property of direct and alternating currents has recently been applied by M. Mercardier, Principal of the Polytechnic School at Paris, to perfecting a system of telegraphy. He is able to send numerous telephone messages along an ordinary telegraph wire without affecting in the slightest the working of the ordinary telegraph instruments. The principle of the system is not unlike the phonopore of Mr. Langdon Davies, but instead of a tuned reed M. Mercardier uses a telephone adjusted so that it only responds to a current of a certain frequency. A diaphragm, 4 in. in diameter, vibrates in front of an electromagnet which is excited by the current from the line. A small piece of carbon in the centre of the diaphragm and another piece at the extremity of a long vertical spring complete the microphonic contact required to work the receiver. It is found that the currents in the line do not interfere in the slightest degree with one another, each receiver vibrating only to its own current. The system has been tested between Paris and Bordeaux. Twelve operators sent messages simultaneously for several hours whilst at the same time the ordinary telegraph messages were being sent. It is extraordinary that a single wire can transmit so many messages simultaneously without interference, and M. Mercardier believes that the number of messages could easily be doubled.

A Welsh Paradise.

DR. WHEATON'S Report to the Local Government Board on the sanitary circumstances of the Llandilofawr Rural District, Carmarthenshire, states that the dwellings are, as a rule, well-constructed of stone, but the downpipes discharge on the ground surface in the absence of drains to which they can be connected; many dwellings have been built without damp-courses; and from these causes and owing to the general absence of any impervious paving around houses, the foundations are soaked in moisture and the walls rendered damp. Water supply is pretty good (a public supply) at Upper Brynamman town and the group of dwellings known as Cwmamman; but at Panty-

ffynnon the water supply is derived from a roadside watercourse, the water in which appears to be derived from the drainage of a field, and pig-sties and privies are now in course of erection within a few yards of the point at which the water appears to take its origin. At Ammanford there are a number of private wells in yards and in gardens, which are shallow, drysteined with boulders, sunk in the loose drift, and exposed to risks of contamination by soakage of liquid from cesspools, and by filth washed into the ground during periods of rainfall, from privies, and from collections of manure and refuse which are frequently situate in proximity to them. There are no house drains in connexion with dwellings in the district. There are a few cesspools and catch-pits in Ammanford district, in which liquid refuse from the surface is collected; but they are never emptied, and the filth escapes by soaking away into the ground, thus endangering the purity of the water furnished by neighbouring wells. Privies are in general use, but in some parts of the district appear to be regarded as unnecessary, and are sometimes used as pig-sties or store-places, and the ground around dwellings is often littered with excrement, the inhabitants being disinclined to make the exertion involved in going to a privy which may often be many yards distant from the dwelling-house, and disinclined also to make the necessary exertion required for emptying the privy and disposing of its contents. For the last reason privies are, wherever possible, set over water-courses so that the filth falls directly into the water; and in this manner many rivers and streams are polluted by fœcal matter.

The University Library, Cambridge.

THE Senate have "non-placeted" the proposal of the Library Syndicate to construct a building in the Schools Quadrangle. We understand that Mr. W. C. Marshall's plans and designs provide for a floor, level with the first floor of the existing rooms, resting upon iron columns set at a distance from the walls, clear from the buttresses, and so as to leave a passage-way around, the new floor being gained by a bridge, and being roofed in part with glass and iron. The quadrangle has suffered manifold changes since it was built at intervals on Nigel de Thornton's ground, and the gardens of the Crouched Hospital, Trinity Hall, and Corpus Christi College in the fifteenth century. The northern side (Divinity Schools) was finished in or soon after 1400; the western side (Canon Law School, since the Arts School, and library over it) was next begun, and completed fifty years afterwards; the southern side (Philosophy and Civil Law) was erected in 1458-70. Most of the tracery, wrought in soft stone, has disappeared from the windows. In 1659-60 is entered a charge "for cutting needless stone out of the windows to gain light" in the Divinity School. In 1583-4 the buildings had been underpinned, and in 1646-7 double rows of wooden columns had been placed under the floors of each of the schools. Thomas Rotherham, Archbishop of York, built in 1470-3 the Gothic eastern front, opposite Great St. Mary's Church, depicted in Loggan's bird's-eye view of about 1688. A Classical order replaced that front in 1754-5. Sir John Cotton bought the gateway for the courtyard at Madingley Hall, near Cambridge. Rotherham's statue, with those of his co-benefactors to the library, was placed in the gatehouse of the Old Court of King's College which the late Mr. Pearson incorporated in his new library buildings (1888-9) erected on the west of the old quadrangle. In 1829 the University bought for 12,000*l.* the buildings and site of the Old Court, and six years afterwards cleared the ground (whilst leaving the unfinished gatehouse), having in mind to rebuild the entire quadrangle. In the result the north side of Cockerell's design was erected, 1837-40, along Senate House-passage, Cockerell's design having been preferred to those of Wilkins, and Rickman. In 1864-7 was added the southern wing, extending westwards, by Sir G. G. Scott, who also added a third story to the Old Common Library on the south side of the older quadrangle. In 1716-7 the Law Schools were fitted as a library and the Dome-room was built. The Divinity Schools, beneath the catalogue-room, were vacated in 1879 at the opening of the Selwyn Divinity School buildings designed by Mr. Basil Champneys, opposite St. John's College. Loggan depicts the Schools Tower, or Belfry, containing the staircase in the south-eastern corner of the quadrangle which was pulled down in 1732 on the opening of the Senate House, when the Regent House over the Divinity Schools was taken for housing King George I.'s gift of the 30,000 volumes which he had bought for 6,000*l.*—the library of Dr. Moore, Bishop of Ely.

COMPETITION FOR FIRE STATION AND POLICE COURTS, MANCHESTER.

IT is somewhat surprising that only twenty-five sets of designs were submitted in this important competition, and of these one at least can only be regarded as a practical joke. The premiums offered were 300*l.*, 200*l.*, and 100*l.* (nearly 1 per cent. of the estimated cost of the buildings), and the Corporation undertook to employ a professional assessor "to assist them in determining the merit of the designs," and also stated that the designs would be submitted to a "quantity surveyor of repute," whose duty it would be to reject every design which would in his opinion cost more than 75,000*l.* The latter provision is a reflection on the decisions of some architectural assessors, who seem to think that a limit of cost is stated only to be exceeded, but is one which cannot fail to be appreciated by those competitors who honestly strive to prepare a design in accordance with the conditions. The work of competing architects was also simplified by the issue of plans of the four principal floors, drawn to a scale of 8 ft. to an inch, and showing the detailed arrangement of the several departments. These plans were complete as regards the fire-station, which is by far the most important part of the building, and also as regards the ground floor of the police and ambulance stations, but the branch bank, firemen's library, and policemen's quarters were only indicated in block, the details being left to the ingenuity of the competitors. Nearly all the competing architects have found these plans of the greatest service, although in no case has slavish copying been attempted; indeed, this was impossible, as the plans did not in every case tally with the amended schedule of accommodation. Broadly speaking, however, the competition, in consequence of the issue of these plans, resolved itself into a competition for the best external design accompanied with improvements in the details of the planning.

The site is in shape a trapezium, having the principal frontage (260 ft. long) towards London-road, a return frontage (284 ft. long) to Whitworth-street at right angles to the former, a rear frontage to Commerce-street (97 ft. 3 in. long) at right angles to Whitworth-street, and an oblique frontage on the fourth side (328 ft. 6 in. long) to Fairfield-street. All the angles were to be splayed, the length of the splays varying from 6 ft. to 15 ft. The area of the site is 5,632 square yards. The buildings shown on the so-called "sketch plans" are about 36 ft. wide, and are arranged around the site so as to enclose a large yard or quadrangle for drill and other purposes. The principal entrance to this yard is shown in the centre of the London-road frontage, the space to the right being devoted to the gymnasium, and that to the left to the library and bank. The end of the gymnasium forms the extreme left of the Whitworth-street front, and is followed by the three loose boxes and the repairing shops. The police-station extends from these to the junction with Commerce-street. The ambulance-station is in the middle of the short front towards the latter street, and nearly the whole of the Fairfield-street front is devoted to the fire-engine house and rooms appertaining to it. The second officer's house is at the obtuse angle formed by Fairfield and Commerce streets, and the stairs to the chief officer's house are close to the bank at the London-road end of Fairfield-street.

The first premiated design (No. 23), by Messrs. Woodhouse & Willoughby and Mr. John Langham, of Manchester, follows this arrangement pretty closely. The principal alteration is in the location of the gymnasium, this being placed with the end to London-road and the side to Whitworth-street, instead of *vice versâ*. This involves the removal of the repairing shops from the Whitworth-street to the London-road front. The police-station is in the position shown in the sketch plans, but the arrangement of the cells is altered so that each has an external wall in which a window is placed. This is decidedly an improvement. The stairs to the firemen's tenements and duty and recreation rooms are also designed with less wasted space on the landings. The tenements themselves, however, which are arranged on three floors over the fire-engine house, &c., are not improved; in the sketch plans the pantries are against the external walls and can therefore be lighted and ventilated, while in the accepted design they are in the middle of the building; the direct entrance from the balcony to the living-room is also less satisfactory in some respects than the passage arrangement suggested; and the central L-shaped hall or lobby in the middle of each tenement can scarcely fail to be dark and dirty. The policemen's tenements, which are not shown on the sketch plans, are more satisfactory; they are placed over the police-station, two on the first floor, three on the second, and one on the third, and are conveniently entered from the staircase landings and balconies. The remainder of the third floor over the police-station is given to the policemen's billiard-room and laundry, and the playground for policemen's children.

The library and bank are well planned, and the chief fire-brigade officer's house occupies the first and second floors over the latter. In order to provide a symmetrical front towards London-road a third story has been placed over the bank, &c., and allotted to bachelors' quarters. In the answers to competitors' questions it was distinctly stated that "no provision is to be made for single men."

The elevations are in the familiar type of English Renaissance, and each of the four has been carefully considered, which is more than can be said of many of the designs. The London-road front, which is the most important, has a slightly projecting central feature, containing the large arched entrance to the drill-yard, with an ungainly oriel over; columns and pilasters on pedestals run through the second and third stories, and the cornice is surmounted by a nearly semicircular pediment, above which is an equestrian group. There are four bays (with coupled columns in the second and third stories) on each side of the central feature, and beyond these are other projections (with rusticated quoins) rising one open story above the main cornice and terminated with semicircular domes. This group occupies the greater portion of the front, and has a rusticated ground story with wide, flat-arched windows; two windows are placed in the plain first story, over each ground-story window; above these, between each pair of pedestals supporting the coupled columns, there is a wide and low single window with semicircular arch; and in the third story the windows are again double and ornamented with the inevitable cheeses and tea-chests. To the right and left of the main group are recessed portions with mansard roofs, the cornice being a story lower. These lower portions are terminated by octagonal turrets rising to a considerable height. So far the elevation is symmetrical, but beyond the

left-hand turret a portion over part of the bank is carried up to the central level, and crowned with an octagonal metal-covered cupola. The main cornice, except where the mansard roofs occur, is surmounted by a balustrade. The design bears evidence of careful consideration, but the pedestals supporting the coupled columns might with advantage be omitted; the second-floor windows are not of pleasing proportion; and the two gables enclosing semicircular lights (one in the centre of each curb roof) are quite out of character. The Whitworth-street frontage is more satisfactory. The grouping is quite different; at the middle and ends are portions with curb roofs, and between these are two higher and slightly projecting masses of six bays each, the end bays being brought forward and ornamented with columns and semicircular pediments. The ground story of the Fairfield-street frontage is very well designed, but the upper part is marred by the oval windows, nearly 8 ft. wide, and the projecting portions are over-windowed for satisfactory effect. The design as a whole is, however, well considered. Variety is given by the different massing of the four elevations, and the authors may be trusted to make improvements in detail during the preparation of the working drawings. Two bays are shown to a larger scale; the details are restrained and correct, but somewhat lacking in distinction.

The second premiated design (No. 25) is the work of Mr. George Watson, of Edinburgh, and, as regards the planning, follows the sketch plans still more closely than the accepted design. The prisoners' cells in the police-station are arranged (as in the sketch plans) in the middle of the building, with the corridors between them and the external walls, and are without direct light and air. The policemen's tenements are badly planned, being entered on two floors from narrow L-shaped corridors without windows; what these corridors will be like may be gathered from the fact that the long leg of each has a length of 90 ft., and the short leg 42 ft. Two of these tenements have the living-rooms and offices on the first floor, and the bedrooms on the second floor, the latter being approached by private flights of stairs.

On the first floor the doors of two tenements must be passed to reach the third. The elevations are simpler than those of the first premiated design. Some portions of the building are only three stories high, and the main cornice is carried round the whole building at the same level—that is to say, above the second-floor windows. This cornice has a plain frieze and no architrave. The detail is coarse, and there are some unhappy features, such as the heavy columns, 19 ft. high (rusticated in the lower parts), carried on corbels. The central feature of the London-road frontage is bald. The Whitworth-street frontage has for its central projecting feature an uninteresting mass of walling, with small windows to the stables on the ground floor, and slits to the hay and provender stores on the first and second floors; above is an attic story containing five wide arched windows and crowned with a pavilion roof and cupola. The apparent uniformity of height on either side of this attic story is deceptive, as the roof to the left is a curb roof, while that to the right is of ordinary pitch. The Fairfield-street front is more Dutch in character, and does not harmonise well with the London-road front.

The third premium has fallen to Messrs. Mangnall & Littlewoods, of Manchester. Their design (No. 19) follows the sketch-plans very closely. The tenements are slightly altered, the living-rooms being entered directly from the balconies, and the rooms being grouped around small dark lobbies in the middle, after the manner of the accepted design. A curious feature is that the first-floor tenements in Fairfield-street are *en suite*, the bedrooms and living-rooms of successive tenements having doorways between them; probably this is intended to show how a bedroom can be taken from one tenement and added to another, as circumstances may require. The planning has not been sufficiently considered in connexion with the elevations, with the result that the external grouping has a haphazard appearance, quite out of character with the Renaissance type of architecture adopted. This defect is most marked in the most important frontage, namely, that to London-road; the left-hand third of this front is a story lower than the remainder, and no attempt has been made to treat the whole as one dignified composition. The Whitworth-street front is more satisfactory, although the different treatment of the police-station, with the floors at a lower level than the rest of the building, may be objected to. The authors have been most successful with the Fairfield-street elevation; this has a four-storied portion occupying about three-fourths of the length, but not quite in the middle of the front; the end portions are a story lower. The central part has high-pitched gables at the middle and ends, the former being flanked by wide bays of small projection carried up an additional story and crowned with lofty octagonal roofs and cupolas. The upper portion of the hose-tower is picturesquely designed. Indeed, the detail generally is good, but the design is marred by unsatisfactory grouping.

After proceeding so far in his task, the first thought of the reviewer is that the remaining designs must be either commonplace or costly to have been passed over in favour of the three premiated designs, and this thought is in the main corroborated by inspection. Very few indeed of the twenty-two rejected designs are of striking architectural merit, and these have probably been rejected on account of the cost, as estimated by the quantity-surveyor, being in excess of the limit imposed. Design No. 1 is decidedly original both in plan and elevation. The gymnasium is placed in the middle of the London-road front, with the library and bank to the right, and the electrician's room and offices to the left. The engine and ambulance houses open into Fairfield-street, and the yard entrance is in the middle of the Whitworth-street front with the hose tower by the side of it. The chief officer's house is much too large, the drawing and dining rooms are 29 ft. by 20 ft., with bay windows in addition, and seven bedrooms, two bathrooms, three water-closets, sitting-room, boxroom, kitchen, &c., are also provided. Thirty-five complete tenements are provided for the firemen, and seven for the police, in addition to officers' quarters. The instructions asked for accommodation for thirty-five firemen and six policemen, and certainly seemed to indicate that complete tenements must be provided for all; the accepted design contains only twenty complete tenements for firemen. The elevations of design No. 1 are well conceived and admirably drawn. The three principal elevations are symmetrical with the exception of a tower at the left-hand corner of the London-road front, and show a dignified treatment, rusticated masonry being largely used and well-designed, carving being introduced in broad masses. This is a good design, but the author cubes it out to 1,717,363 ft., an amount considerably in excess of the first premiated design. The price allowed for the latter is 1s. a cubic ft., and for the former, 10½d.

No. 3 is an attractive set of drawings, but the engines are placed in Whitworth-street, and the drill engine-room is separated from the gymnasium. The author has thoroughly grasped the problem of the elevations, and has obtained a symmetrical and dignified front to London-road; a concave recess is planned, in the middle in which the archway (two stories high) leading to the yard is placed. The ground story is rusticated with segmental arches to the windows; massive columns run through the next two stories, and the main cornice is surmounted throughout the greater part by a mansard roof. The central tower is, however, weak, and the order adopted is not well proportioned. The fronts to Fairfield-street and Whitworth-street are more thoroughly Georgian in character, and of considerable interest.

The elevations of No. 8 are very elaborate and costly, but without freshness, and somewhat feebly drawn.

No. 10 shows a knowledge of Mr. Aston Webb's design for the Birmingham Law Courts, but "the little more and how much it is, and the little less and what worlds away."

The Fairfield-street elevation of No. 11 is the most successful of the four; the treatment is simple and generally refined.

Design No. 12 can only be regarded as a joke, and we trust that the Corporation will show their sense of its unfitness by withholding the two guineas which the author paid for the conditions of the competition.

The acute angle between London-road and Fairfield-street is cleverly planned in No. 14, but the elevations are rather heavy and costly.

No. 16 is shown in a set of wash drawings, which as far as draughtsmanship is concerned are decidedly the best submitted; no attempt has been made at symmetry, but the design is interesting throughout. The chimneys brought to the front of the buildings are, however, a mistake; they are diamond-shaped in plan, measuring about 7 ft. by 5 ft., and rising 24 ft. above the main cornice and about 19 ft. above the top of the parapet. The design is effective but costly. The cubical contents are about 2,500,000 ft.

No. 18 has the gymnasium in the middle of the London-road front, and the yard entrance in Whitworth-street. The tenements are ingeniously altered from the sketch plans, but the bathrooms entered from the balconies would not be appreciated. The elevations are of a pleasing character, and neatly drawn.

It cannot be said that the designs as a whole reach a high level. A commendable feature is that the authors' reports are appended to the drawings, but the authors' names are not given.

CONTINENTAL OPINION AND PRACTICE IN REGARD TO CEMENT TESTING.

THE third Congress of the International Association for Testing Materials was held in the Hall of the Royal University of Technical Sciences at Budapest, from September 9 to September 14. At this Congress a number of papers by representatives from different countries were read in regard to cement and cement testing. The following *resumé* of the contents of some of these has been forwarded to us from Budapest, and may be of interest as showing the state of opinion and practice on the Continent:—

In Germany especially the increase in the manufacture of cement has been enormous, and from the latest statistics it is to be feared that foreign cements, chiefly of German and Belgian origin, are supplanting the products of English manufacturers, even in England. During the first nine months of this year the imports of cement into Great Britain amounted to 156,760 tons against 70,439 tons for the corresponding period of 1900. The import of foreign cement into London has increased during the nine months by 244 per cent., although the neighbourhood of London abounds in the necessary raw materials. This seems to indicate that the English cement industry is not in a state of progress, and that English manufacturers must seek cheaper methods of production and possibly, at the same time, endeavour to produce better material.

The only paper presented in English, and the one which deserves the first consideration, as it directly affects a large number of English manufacturers, was one on "The Constancy of Volume of Cements," by Mr. Bertram Blount, of London, Cement Chemist and Expert to the English Admiralty and to several Colonial Governments. The author described a form of hot test for Portland cement which in its qualitative form has been long applied to cement to be used in the construction of harbours and other public works. It is proposed to adopt the test in its quantitative form as follows:—A bar of neat cement is exposed to the influence of water at 45 deg. C., and the expansion observed by means of the Bauschinger apparatus. A good cement should remain absolutely free from cracks and expand not more than 2 per cent., attaining constancy of volume in seven days. Experiments with sixty-eight specimens of cement, produced by five leading English manufacturers, gave satisfactory results in twenty-nine cases.

Commenting upon this paper, Professor Tetmajer, of Zurich, President of the International Association, and the best known authority on the Continent, observed that a hot test for cement was already adopted by the Swiss Federal Government, and of 127 specimens tested in his laboratory, which had fulfilled the requirements of the usual mechanical tests, only three failed under the hot test.

Mr. Blount's paper was eventually referred to a sub-committee of the International Association.

It should be mentioned that the opinions expressed in the papers read by experts of different nationalities indicate that a form of hot-water test will be included in the specifications for Portland cement to be discussed at the next Congress, especially in the case of cement required in the construction of harbours and in other heavy work.

Professor H. Le Chatelier (Paris), in a paper on "Simplified Rapid Tests for Cements," discusses four methods which may be used for the acceptance, but should not be taken to warrant the rejection, of cement. The *fineness* of the cement can be tested by the sieves with 900 and 4,900 meshes to the square cm. The nature of the particles, which are so fine as to form a dust, is determined by observing the quantity of water required to produce a paste of a certain consistency. The *time of setting* can be readily ascertained by means of Vicat's needle or simply by pressure with the thumb. The setting is ended when no impression is left on the surface of the cement by the needle or the thumb. For determining the *constancy of volume*, a hot-water test may be employed. If placed in water at 100 deg. C., lime ceases to expand after three hours and magnesia after six hours. Cement manufacturers complain, apparently with justice, that the hot-water test is too severe, and that a cement which has stood the cold-water test for twenty-eight days is good, whatever may be the result of the hot-water test. The author of the paper has already shown that irregular strains in cement disappear in the course of time, and it is easily possible that cements which, under the influence of heat when setting begins, disclose a certain quantity of free lime may prove suitable in practice. Hence this test cannot be used for the rejection of cement, but in case the cement stands the test it may safely be accepted. The test consists in exposing specimens prepared from normal paste to the action of water at 100 deg. C. after the paste has been allowed to set for twenty-four hours. The expansion produced is measured either by employing Le Chatelier's needle forms or by Klebe's needle process, or by noting the external change of iform in the specimens. The maximum expansion should lie between 1 and 2 per cent. Every well-conducted Portland cement factory can supply products which will satisfy this test. With regard to the mechanical tests for ascertaining the *strength of resistance* to tensile and to compression forces, only one need be carried out, since they give practically corresponding results. As cement is only used with sand, it is sufficient to test a mortar consisting of one part by weight of cement and three parts by weight of sand. The sand employed is prepared by mixing three kinds of sand of different grain. In the case of Portland cement, slag cements, and quick-setting cements the test may be concluded after eight days, since these cements have in that time attained their maximum strength. The practice of using stamped specimens arose from the desire of the manufacturers to point to a greater strength of resistance in their products, but is in reality without advantage. Either the tearing test or the bend test may be employed, but the latter is accepted as being the simpler. Bars of section, 20 by 20 mm., are placed on supports 100 mm. apart and bent seven days after the process of setting is complete.

Mons. M. Mercier (Paris) compared the results of tension tests with bricks of the usual 8 shape and of bend tests with prisms, using three kinds of sand in preparing the specimens, and showed that the percentage average deviation, calculated on the average of the results of six tests for each series, is smaller for prisms than for the bricks both for cement paste and cement mortars. The ratio of the resistance to tension and to bending is 1·9 for pure pastes of lime and of cement, and shows a tendency to increase when the specimens with the lapse of time become more solid. For mortars of lime and of cement the ratio is 1·7, and there is no tendency to increase in the case of tests of long duration.

Mons. L. Deval (Paris) described experiments proving that the presence of calcium sulphate occasions in hydraulic mortars an increase of volume which can exceed 100 per cent., the increase being due to the combination of the calcium sulphate with the tri-calcium aluminate of the cement. Calcium sulphate has no action on a cement which contains no aluminium or which does not contain enough calcium for the aluminium to form a tri-calcium aluminate. Those cements most exposed to injury under the influence of calcium sulphate are aluminium cements of feeble hydraulic powers, such as Portland cements. He determined for the compound produced in the expansion the formula $Al_2O_3 3CaO 3(SO_3CaO)$.

A paper on "The Present State of Cement Testing in Germany" was read by Professor Max Gary, Chief of the Building Materials Department in the Royal Mechanical and Technical Testing Institute at Charlottenburg, Berlin. To this paper were appended a number of proposals which gave rise to a lengthy discussion, ending with the adoption of a motion by Professor H. M. Howe (New York), who proposed the appointment of an International Commission to collect, so far as possible before the next Congress to be held in St. Petersburg in 1903, material for establishing normal tests and specifications for Portland cement which may be used in international commerce. The following is a brief outline of Professor Gary's paper :—

The tests for Portland cement as at present employed in Germany are based on "The Revised Rules for the Uniform Supplying and Testing of Portland Cement," published in 1887 by the Association of German Portland Cement Manufacturers. The Prussian Ministers for Commerce and Industry and for Public Works issued ordinances to their departments enjoining the observance of these Rules, and shortly afterwards the same Rules were accepted by all the States of the German Empire. In recent years some changes have been made, and a complete revision of the Norms is in contemplation. In 1882 the practice was begun of mixing finely-ground furnace slags with Portland cement, and, consequently, in a preface to the Rules of 1887, Portland cement is defined as the product obtained by pulverising the shrunken mass resulting from the burning of an intimate mixture of substances containing lime and clay as essential constituents. Members of the Association are pledged not to bring into the market any other product than the above under the name of Portland cement. No foreign bodies may be added, either during or after the process of burning, except small additions to the extent of 2 per cent. required for regulating the time of setting. Members must submit their products to tests applied at the discretion of the governing Committee, and infringement of the regulation is followed by expulsion from the Association. Recently a number of new factories have been established, chiefly in connection with iron-works, which employ slag in the preparation of Portland cement. This slag it is important to detect, but unfortunately the methods proposed for this purpose are not readily applicable without special arrangements.

As the Rules are applicable only in the case of pure Portland cement produced in accordance with the above definition, a preliminary investigation must be undertaken to ascertain if impurities are present. If the raw materials are not properly chosen, defects arise principally from the presence of lime, magnesia, and gypsum. In good Portland cement there should be from 58 to 67 per cent. of lime and not more than 67 per cent., not more than 3 per cent. magnesia, and not more than 2 per cent. gypsum. The quantity of these three substances present can only be estimated by means of chemical analysis. As additions to Portland cement are employed : colouring matters, clay, sand, ashes, ground limestone, ground slate, hydraulic lime, trass, and silicates of lime, such as slag. These substances, with the exception of slag, are qualitatively detected without difficulty by determining the specific gravity, the rate of loss of heat, the action under the influence of diluted acids, &c. A reliable method of detecting admixtures of slag has hitherto been wanting.

For pure Portland cement Fresenius established the following limits :—

(*a*) A specific gravity of at least 3·125, and in any case not less than 3·1.

(*b*) A degree of alkaline strength such that a water solution containing ·5 grammes of cement neutralises 4—6·25 c.cm. $\frac{1}{10}$ normal acid.

(*c*) An absorption of 18·8—21·67 c.cm. of normal acid by 1 gramme of cement powder under direct treatment and in any case not materially less than this.

(*d*) An action in $KMnO_4$ solution (1·589 g. of $KMnO_4$ in one litre of water) so that 1 gramme of cement reduces from 0·79 to 2·8 milligrammes of potassium permanganate, and in any case very little more than this.

With the same $KMnO_4$ solution Fresenius found that under a similar treatment 44·34—74·67 milligrammes of potassium permanganate were required for different kinds of slag powders, the difference arising from the fact that in Portland cement iron is present almost exclusively in the form of ferric oxide, whereas in slags it is present only as ferrous oxide.

It has, however, quite recently become known that cements which have been burned in a revolving furnace or in the reducing flame likewise require the use of a considerable quantity of $KMnO_4$, although they do not contain slags. Therefore the $KMnO_4$ test has no decisive value for proving the presence of high-furnace slags, and can only be used as a preliminary test.

In testing for slags the cement is treated with $KMnO_4$, according to the method of Fresenius: If less than 3 milligrammes are required for 1 gramme of cement, the cement cannot be suspected of containing slag; if more than 3 milligrammes $KMnO_4$ must be used for 1 gramme of cement, then the cement can be :—

1. Cement from a revolving furnace (cement burnt in the reducing flame).
2. Cement mixed with high-furnace slag.
(*a*) Made out of raw materials with pieces of slag added.
(*b*) With slag added after the process of burning.
3. Cement to which slag has been added to form an intimate mixture before burning.

The cement is passed into a mixture of methyl-iodide and purified turpentine oil, possessing at 15 deg. C. a specific gravity of 3·01.

The light parts which swim in the fluid can be :—

(*a*) Coal of	average specific gravity	...	...	1·39
(*b*) Gypsum	,,	,,	...	2·33
(*c*) Coal slack	,,	,,	...	2·73
(*d*) Furnace slag	,,	,,	...	2·94

With suitable fluids these different constituents can be separated.

The heavy parts which sink in the fluid of specific gravity 3·01 can be :—

(*e*) Cement of specific gravity 3·035.
(*f*) Iron from the furnace slag and different iron compounds.

The Prussian Rules have fixed no definite limits for the weight of the cement required to occupy a unit of space. They only aim at fixing the gross and net weight of the casks of cement usually found in commerce. The weight of such a cask of cement should be 180 kilogrammes gross and 170 kilogrammes net, and for half a cask 90 kilogrammes gross and 83 kilogrammes net; 180 kilogrammes gross correspond to 400 English pounds. The size of the casks is not prescribed. It has, however, become usual to determine the space occupied by the cement both in a loose condition and when well shaken down. Unfortunately, a uniform method for determining this does not exist. The form of vessel used in measuring is not fixed, although this is important, especially if the cement is in loose condition. Professor Gary recommends a litre measure of about 124 mm. diameter. For filling the measure a funnel with a sieve fixed in the lower orifice should be used.

Portland Cement may be of such a nature that it does not set in less than two hours, and is then described as slow-setting. Quick-setting cement sets in less than two hours. To ascertain the time of setting, pure slow-setting cement is stirred three minutes and quick-setting cement one minute in water until it forms a stiff paste. This is put on a glass plate to form a cake about 1·5 thick in the middle, but becoming thinner towards the edges. The degree of fluidity required for producing this cake shall be such that the paste, placed on the glass plate by means of a spatula, first begins to run towards the edges after the glass plate has been several times shaken, for which purpose, in most cases, 27 to 30 per cent. water suffices. As soon as the cake is hardened to such a degree that it resists a light pressure with the finger-nail, the cement must be regarded as set. For determining more accurately the time of setting and for fixing the moment when setting begins, a normal needle is employed, which weighs 300 gr. and has a cross-section normal to the axis of 1 square millimetre. Then a metal ring 4 cm. in height, and with a diameter of 8 cm., is placed on a glass plate filled with the cement paste of the above-mentioned fluidity, and placed under the needle. The moment in which the normal needle can no longer completely penetrate the cake of cement is to be taken as the beginning of setting. The time which elapses until the normal needle leaves behind on the hardened cake no visible impression is the time of setting.

This process possesses also many defects, that the Association of German Portland Cement Manufacturers, in common with the Testing

Institutes of Charlottenburg and Stuttgart, are engaged in seeking for a more reliable method.

The decisive test for constancy of volume is as follows:—A cake of pure cement is placed on a glass plate, and then after the lapse of twenty-four hours, or after the process of setting is complete, put under water. If during the process of hardening under water deformations or cracks appear on the edges of the cake, this indicates "working" of the cement. This is, as a rule, already visible on the third day of observation, and at all events an observation extending over twenty-eight days is sufficient. The objection to this test is that it requires too much time for the "working" cement to be recognised, and it is rarely possible to wait long enough to allow of a decisive result being obtained before using the cement. Hence the necessity of a more rapid method of determining the constancy of volume. The different hot tests proposed by Michaelis, Heintzel, Tetmajer, Maclay, Deval, Erdmenger, &c., are not decisive because they frequently characterise cements of inconstant volume as constant, and lead to cements perfectly suitable for building purposes being suspected of not possessing constancy of volume. These tests cannot be used for rejecting cement, but are advantageously employed for roughly testing products in the factory, for cements which must possess a special degree of constancy for particular purposes (vessels for hot substances, fine cement articles, large structures lying exposed to the air, &c.), and for testing cement which contains magnesia. Bauschinger's apparatus as improved by Martens is employed for measuring the expansion, and occasionally Klebe's method, in which is used a measuring-rod inserted between two needles fixed at a certain distance apart while the cement is still soft.

With regard to fineness, the Prussian Rules prescribe that Portland cement shall be so finely ground, that if tested with a sieve of 900 meshes to the square centimetre, and such that the thickness of a wire shall be equal to half the space between two consecutive wires, there shall remain on the sieve at most a residue of 10 per cent. The degree of fineness required by this regulation is inadequate in the present state of the German Portland cement trade. The tests carried out at the Charlottenburg Institute show that most German cements leave a very small percentage of residue on the sieve of 900 meshes per square centimetre, and cements which leave more than 20 per cent. residue on a sieve of 5,000 meshes to the square centimetre are very rare. For such a degree of fineness it is impossible to obtain sieves of identical uniformity of structure. Moreover, it appears from recent researches that the finest ground cements, if kept lying in stock, undergo a further refinement to an extent altogether indeterminable by means of sieves, but which is apparent from the change in the weight of powder in a loose condition required to occupy a unit of space. It will be necessary to give up this sieve method, and have recourse to the wet method or to sifting with wind.

The binding force of Portland cement is determined by testing a mortar consisting of three parts by weight of a normal sand and one part by weight of cement. The test is carried out after a uniform method by applying tensile and compression forces with the same apparatus to bodies of similar shape and the same sectional area. Professor Gary proposes to discard the minimum limits of solidity hitherto accepted, or furnish them with a new mark by which the cementing limit between cement and sand would be expressed in such a manner that it could be seen which cement attains a certain solidity with the highest proportion of sand. The normal sand employed is procured by taking pure quartz sand and passing it through a sieve of 120 meshes per square centimetre, the thickness of the wire in the sieves being ·32 mms. The normal sand is taken from the Hammerthal pits in Freienwald.

The Prussian Rules prescribed that the cement and sand should be mixed with 10 per cent. of water, but with cements so finely ground as is now usual in Germany, 10 per cent. water is almost always too much. It is necessary to ascertain the quantity of water which can most advantageously be employed in mixing the cement. To obtain uniformity in mixing, the Steinbrüch-Schmelzer apparatus is employed. The mortar is worked up with 8 per cent. and 10 per cent. of water in moulds provided with grooves, and it can be seen which quantity is more suitable from the circumstance that with the proper quantity of water cement paste should begin to flow in the grooves after 90-100 blows. The quantity of water thus ascertained is used in preparing the specimens for the resistance test. For hammering the specimens intended for the tension and compression tests, Böhme's apparatus, carrying a hammer of 2 kilos, is used, and every specimen is subjected to 150 blows. These hammers are tested in the Charlottenburg Institute to ensure uniformity. With regard to the form of specimens tested, those subject to the tension test have a section of 3 square cm. at the surface of rupture, and the compression test is carried out with cubes, of which each side contains 50 square cms.

The Prussian Rules advise the compression test as the standard test for resistance, as mortars in practice are usually subjected to compressive forces. It has, however, become customary to judge Portland cements exclusively by the tension test, as this can be more conveniently carried out. The effect is that German cement factories, for the most part, guarantee a fixed degree of resistance to tension in the (1 by 3) mortar, and a high resistance to tension is sought for regardless of durability. The Association of German Portland Cement Manufacturers has this year decided to give the compression test the first place, as this test gives more reliable results than the tension test. Professor Martens has shown that the probable error varies in tension experiments, on an average, between ± 3 per cent. and ± 5 per cent., and in compression experiments the error varies only from ± 1 per cent. and ± 3 per cent. The decisive test is carried out after twenty-eight days, although there is usually a preliminary test after seven days. A specimen made with three parts by weight of normal sand and one part by weight of cement should, after hardening for twenty-eight days—one day in the air and twenty-seven days in the water—have a minimum resistance to tension of 16 kilos per square cm., and a resistance to compression of at least 160 kilos per square cm. These figures are higher than those of all other countries, but still too low for the present state of the German cement industry, which owes its prosperity to the careful observance of the Rules and the perfecting of the methods of testing.

It may here be mentioned that, on the invitation of the Russian Minister it was decided to hold the next Congress of the Association at St. Petersburg in September, 1903.

Among the 1,748 members of the Association are 418 Russians, 363 Germans, 232 Austrians and Hungarians, 166 Americans, 97 Frenchmen, and 87 Englishmen.

THE SURVEYORS' INSTITUTION.

An ordinary fortnightly meeting of this Institution was held on Monday at 12, Great George-street, Westminster, Sir J. Rolleston, President, in the chair.

The minutes of last meeting having been read and confirmed, and Mr. J. W. Penfold, hon. secretary, having read a list of donations to the library and library fund,

Mr. A. Dudley Clarke read a paper on "The Final Report of the Local Taxation Committee." The terms of reference to the Commission were: "To inquire into the present system under which taxation is raised for local purposes, and report whether all kinds of real and personal property contribute equitably to such taxation; and, if not, what alterations in the law are desirable to secure that result." The Commission sat for the first time on March 11, 1897, and its work resulted in the examination of 162 witnesses and the publication of eight volumes of evidence and memoranda, in addition to three Reports. The further Reports, dealing with Scotland and Ireland, have not yet been issued. There has not been unanimity of opinion amongst the members of the Commission, but there has been substantial accord on several important issues. The Report of the Majority (Lord Balfour of Burleigh being the Chairman) is signed by twelve out of the fifteen members of the Commission, but there are reservations on the part of some of them to some portions of the Report. Those of the Chairman bring him nearly into line with the views of the Minority Report. There is also a separate Report on Urban Rating and Sites Values, and a Report by Judge O'Connor, who dissented from all his colleagues.

The author dealt with the Reports in a long and able paper, but the subject does not come sufficiently within our province to be noticed at greater length in our pages. A hearty vote of thanks was accorded to the author on the motion of Mr. Sabin, seconded by Mr. G. S. Mathews, and the discussion was adjourned until January 27. The next meeting will be held on December 9, when a paper will be read by Professor Somerville on "Artificial Manures."

THE INSTITUTE OF BUILDERS.

Mr. Woodman Hill gave a lecture (illustrated) entitled, "Submarine Construction by Diving and other Compressed Air Methods: Cylinder Sinking and Tunnelling under Compressed Air," in the Drawing-room of St. James's Hall, Piccadilly, on Wednesday, the 20th inst.

There was a large attendance of the members of the Institute of Builders, their friends, and representatives of the various branches of the architectural, engineering, and surveying professions. Mr. Charles Wall, President, occupied the chair.

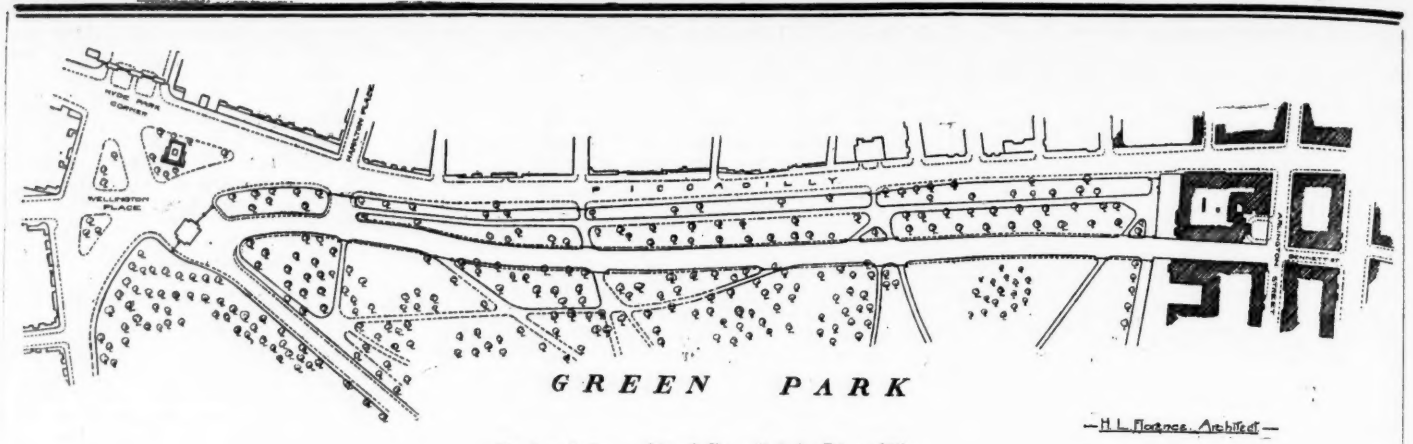
The following is an outline of the lecture:—

After briefly tracing the development of diving from the days of Aristotle to the time of the open-helmet dress, first constructed in 1830, in the employment of which the lecturer subsequently had actual personal experience, he minutely described and illustrated the modern appliances used for diving, the various circumstances under which diving operations are undertaken, and gave valuable information as to the depths at which they are practically possible, and the type of men suitable for this class of work. He also referred to the attempts made to use artificial light under water, to the expedients used for establishing efficient communication between the diver and the surface, and to the great improvements made in this respect after the introduction and perfection of electrical appliances, improvements which would have been impossible without them. A complete modern diving-dress, and helmet fitted with a telephone apparatus, and also a relic of former days in the shape of an original open helmet made by Deane, were to be seen in the lecture-room. The advantages and disadvantages of bell work were then discussed and compared with the work of the individual diver, illustrations of actual works accomplished by both systems being given and explained; these were notably the building of the foundations for the Spithead Forts, the constructions of the foundations for the circular heads of the defensive harbour at Portland now in progress, and a typical example of a sea wall of concrete blocks founded on concrete in bags.

Works constructed of concrete blocks weighing thirty to forty tons apiece, and the positions in which they are necessarily and successfully employed, were next dealt with, and the respective merits of staging with steam winches and of Titan travellers compared; illustrations being given of the staging, travellers, and bells employed in the construction of the various piers and breakwaters at Folkestone and Dover, and of a Titan traveller employed on a Russian breakwater, and the Titan setting the last block of the detached Mole at Gibraltar.

The chapter dealing with this branch of submarine work was concluded by referring to the construction of piers and breakwaters in the open sea by means of concrete in mass deposited in casings or large bags, almost all examples of which have proved unsatisfactory, Mr. Hill giving it as his opinon that, to construct submarine foundations in mass concrete successfully, would require it to contain so large a proportion of cement that the work would be as expensive as building with concrete blocks in which the ordinary proportions of materials were used, and always more risky to execute.

Reference was then made to the rectification and deepening of the channel at the entrance to the Hamoaze at Devonport, which was entrusted to, and has been executed by, the speaker's firm, and which necessitated the removal of portions of shoals, covering in the aggregate an area of more than 30 acres, the depths of which varied from a few inches to 20 ft., and which consisted almost entirely of limestone and shillet rock. The drilling barges, boring appliances (used in a bell worked with compressed air), and dredgers, which were specially designed and constructed for the



Proposal for a Road Parallel to Piccadilly.

work, were illustrated, but only very briefly described as not coming within the scope of a paper on construction.

What may be described as land works requiring the employment of compressed air, on account of more or less percolation of water through the strata to be dealt with, were then briefly entered into, and the methods of cylinder sinking by the compressed air process, and the employment of these methods in dock work and continuous quay-wall work abroad were explained and illustrated; the instances mentioned were the construction of the foundations of the harbour of La Pallice at La Rochelle in France, the wharf walls in the Garonne at Bordeaux, and also dock work on a large scale at Genoa; the author expressed his opinion that foreign engineers were much in advance of English ones in the employment of these methods.

Reference was then made to the dock works at Keyham, where a portion of the main outer sea-wall is being built upon concrete columns sunk to the depth necessary to secure a solid foundation by novel and interesting methods. The lecturer concluded his paper by speaking generally but briefly of what he described as horizontal cylinder driving or tunnelling by compressed air methods, as found necessary in the gravelly and sandy portions of the City and South London Railway, the Waterloo and City Railway, the Tower Subway, and also in connexion with the completed Blackwall Tunnel, which he described as the finest work of the kind in existence.

The President thanked Mr. Woodman Hill for his able and interesting lecture, and a cordial vote of thanks, moved by Mr. T. F. Rider, seconded by Mr. John Greenwood, was passed to him.

COMPETITIONS.

Dispensary, Leeds.—The designs of Messrs. Bedford & Kitson, architects, of Leeds, have been accepted for the new public dispensary for Leeds, to be erected in Hartley Hill, North-street. The present building is to be demolished in connexion with street improvements.

Pavilion, Llandrindod Wells.—In the competition for pavilion, laying out recreation-ground, &c., Llandrindod Wells, the first premiated design was by Messrs. R. Wellings Thomas & W. Alec Millward, Llandrindod Wells. The second premiated design was by Mr. J. H. Williams, Worcester; and the third by Mr. E. P. Morris, Llandrindod Wells.

Builders' Clerks' Benevolent Institution.—At a special general meeting on the 26th inst., Mrs. Sarah Gough was elected to a full pension of a widow, 24*l.* per annum. Mr. Wm. Seymour was also elected to the builders' clerks' pension of 30*l.* per annum.

Cornwall County Asylum Extension.—At Cornwall County Asylum, on the 21st inst., Major C. E. Norton, R.E., held an inquiry on behalf of the Local Government Board into the application of Cornwall County Council for an extension of their borrowing powers and for permission to borrow 105 000*l.* for the extension of the asylum. Mr. Cowlard, Clerk to the County Council, explained that for the extension of the asylum 105,000*l.* would be required. The tender of Messrs. Pethick Bros. was for 87,973*l*, the cost of furnishing was estimated at 8,000*l*, and drainage 2,000*l*. Mr. Trevail informed the inspector that the stone to be used was local stone, and Mr. Cowlard observed that the period of the loan would be as long as possible. There was no opposition.

PROPOSAL FOR A NEW ROAD PARALLEL TO PICCADILLY.

The accompanying plan has been prepared to show an alternative scheme to the official proposal already before the public in regard to the relief of the congested traffic in Piccadilly. The inadequacy of the method suggested to widen Piccadilly by taking a strip off the Green Park up to Walsingham House has been pointed out in most of the organs of the Press, and the practical result of this scheme would be to create a worse block than at present exists where the narrow part at Berkeley and Arlington streets commences.

As a means of obviating this difficulty it is proposed to continue the line of Jermyn-street and Bennett-street by a road parallel to Piccadilly, through the Green Park, to a junction with Constitution Hill at the Wellington Arch.

Only one house in Arlington-street would have to be acquired to open out this route; the public underground conveniences, recently constructed at great cost, facing Devonshire House would not be interfered with; the new road, being generally at a lower level than Piccadilly, would not seriously diminish the attractiveness of the Park; comparatively few trees would have to be removed; and the present Piccadilly pavement, trees, and railings would be unaltered.

This duplicate line of transit east and west could not fail to attract the carriage and cab traffic, thus greatly relieving the overcrowding from Hyde Park Corner to Piccadilly Circus, and although this road would, like Constitution Hill, be closed at night, no inconvenience would result therefrom, as the congestion only exists in the daytime.

An additional relief would be afforded by the entrance to the new road through gates facing Hamilton-place.

It is to be hoped that the authorities may yet give further consideration to this matter before deciding upon carrying their present plan into execution.

H. L. Florence.

ARCHITECTURAL SOCIETIES.

Edinburgh Architectural Association.—New rooms have been acquired for this Association. They are situated at No. 117, George-street, on the first floor, and consist of two large apartments. The room to the back forms the meeting-room for lectures, while the front room is the reading-room. The rooms have been improved, electric light introduced, and completely redecorated. It is intended that the front room will be used as a sort of clubroom where members may consult the books in library and the professional journals. Stationery is also provided for use. Smoking will also be allowed in this room.—At the last meeting of the Committee of Management it was resolved to present a testimonial to Mr. Thomas Fairbairn in recognition of his long service as Honorary Secretary to the Association, and to invite subscriptions for the same. Subscriptions to be payable to Mr. John Johnston, C.A., Hon. Treasurer, 28, Dundas-street.—The Council have had under discussion the designs for the new buildings, proposed to be erected at the Castle, and recently exhibited in the City Chambers. After having inspected the plans, the site and the probable effect from various points of view, and having fully considered the question, they resolved as follows:—"The Council desires to express its sense of the courtesy of the War Office in giving the citizens an opportunity of seeing and discussing what is proposed to be erected on a site so unique in position as Edinburgh Castle. The Council feels most strongly that a site of its commanding position demands the most careful and skilful consideration, and although it is evident that no little attention has been directed to the preparation of the designs, the Council observes with great regret that from any point of view the outline of the great mass of the Castle and its buildings will be disfigured; and, further, that the general designs do not commend themselves as being in harmony with the better work on the Castle Rock. The Council trusts that, as this question is one of very great and permanent importance, nothing will be done without further serious consideration."

Leeds and Yorkshire Architectural Society.—The first meeting of the winter session of the Leeds and Yorkshire Architectural Society took place on the 21st inst. at the Queen's Hotel, Leeds. Mr. Butler Wilson, President, occupied the chair. During the evening the prizes were distributed to the successful students. For the best measured drawing work the prize was given to Mr. S. R. Day, of Skipton. To Mr. J. Hinchcliffe, formerly assistant with Mr. Bowman in Leeds, and now of Chorley, in Lancashire, four prizes, making a total of eleven guineas, were presented. One was for the design of a village church, another for the construction of a village church roof, a third for the best essay on ancient ecclesiastical architecture in Leeds, and a fourth for sketching. A letter was read from Mr. George Corson presenting to the Society the portrait of himself which had been given to him by the members of the Society. Mr. Corson was the Society's first president when it was founded twenty-five years ago, and it is partly in commemoration of that fact that the painting, which is by Mr. H. Willson, was subscribed for. The gift was gratefully accepted. The President, in his inaugural address, said the Council of the Society had suggested that, in the event of the Leeds Queen Victoria Memorial Committee deciding to place the proposed memento in Victoria-square, the area of the square should be increased, and that an architectural laying out of the square should form an inseparable part of the scheme. A resolution to this effect had been forwarded to the Lord Mayor, and there was every reason to hope that it would receive consideration. To students he would say that in these days of accumulation of material things the great requisite for success was enthusiasm. The means of education to-day opened out a path by which students might follow in the footsteps of the authors of the greatest architectural achievements. The Royal Institute of British Architects, with which the Leeds and Yorkshire Society was allied, had over 1,740 members, and there could be no better foundation for an architect's education than the working for the qualifying examination of the Royal Institute. Dealing with the progress and outlook of the profession, Mr. Wilson observed that any man who left this country twenty, or even ten, years ago was amazed on his return at the changes that had taken place in our towns and cities. There had been a vast increase of population and education, and, it followed, a greater amount of accommodation had been required for intelligent persons, so our great towns and cities had turned in their sleep, and were now in the process of rehabilitation.

Already the principal streets of our cities were overcrowded and almost impassable, and the necessity for subways was suggested on all hands. "In this wholesale reconstruction," the President proceeded, "we see the danger of uncontrolled action, and we, as being principally concerned in the responsibility, will have to take strong measures in dealing with the danger. Our cities are of themselves undergoing great transformations—they are in closest touch with each other by railway, and also in many cases electric traction is establishing the greatest intimacy between them and their neighbouring villages. Most of the reconstruction seems to have been carried out without plan or system, or any consideration for the ultimate development. No thought is given for providing great arteries of communication from centres to outlying districts; architectural treatment is uncontrolled; owners and builders seem to have had carte blanche for ugliness. I would suggest that these conditions ought to be effectively dealt with, and that schemes be prepared for the probable and ultimate development of our cities and towns consequent on their rebuilding, proper sites for future public buildings being carefully selected; that provision be made for subways; and that the insanitary areas be cleared in accordance with such schemes; so that the whole may be homogeneous as well as conglomerate." The formation of County Councils in place of rural and urban authorities was resulting in the erection of public institutions, county halls, hospitals, and asylums. These designs were often inadvisably obtained by competition, perhaps a clumsy and costly means of obtaining the best results, and certainly very costly so far as the profession of architecture was concerned, for the conditions of competition were usually unfair and unreasonable, and even in the event of an architect winning a competition, it did not always follow that the execution of the work was entrusted to him. The subject was, he was glad to say, receiving very serious attention.—Mr. H. Perkin proposed a vote of thanks to Mr. Wilson for his instructive address. Mr. W. H. Thorp, in seconding, said that within a few weeks the Society would reach the twenty-fifth anniversary of its foundation. The presence of so many young members of the profession that evening augured well for the Society's future. The President having acknowledged the compliment, the remainder of the evening was devoted to a smoking concert.

MANCHESTER SOCIETY OF ARCHITECTS.—At the Queen's Hotel, Manchester, a few days ago, the annual dinner of the Manchester Society of Architects (Incorporated) was held. Mr. Alfred Darbyshire, the President of the Society, presided. The President, in proposing the toast of "The Royal Institute of British Architects," spoke of its numerical growth. He could not help referring to the fact that some fourteen or fifteen years ago the designs of Mr. Emerson, the President of the British Institute of Architects, were chosen in the competition for a cathedral at Liverpool as being the best. The organisers of the Liverpool Cathedral scheme had now decided to build it on another site, and it was one of the most regrettable incidents which had occurred in their profession that Mr. Emerson had decided not to compete again.—Mr. Emerson, in replying, said that, in connexion with this matter of the Liverpool Cathedral, he had been surprised to see a statement that it was to be sincerely hoped that the genius of the country would produce a building in a new style. He could not help thinking that such remarks were calculated to do an enormous amount of harm and cause a deterioration in architectural progression. No doubt there was a very considerable striving after originality at the present time, but, unless one could show that it was better to diverge from known principles and known proportions, it was better to stick to the old lines.—Mr. E. Salomons, who proposed the toast of "The Corporation of Manchester," said that the Improvement Committee was not an originating committee. It never seemed to have a grand scheme in hand. It was always widening Cross-street by 6 ft., or Market-street by 2 or 3 yds.; but never, in his fifty years' experience of Manchester life, had he seen any really grand scheme put forward in Manchester. He had been abroad a great deal and seen what they had done there in the setting up of boulevards, particularly in the case of Brussels, where a grand boulevard had been made 250 ft. wide, with two rows of trees on each side of it. Of course, in Manchester they could not grow trees, but he had never seen such an idea put forward in regard to Manchester; they had never had any suggestion of that kind; nothing but merely the widening of streets. He hoped that under the régime of the present Lord Mayor of Manchester they would see some such scheme for the development of Manchester which they had never seen before. He had also been informed that it was proposed by the Manchester Corporation to appoint a city architect, and not merely a city surveyor or engineer. They had felt the want of it for many years, and he believed it was on the *tapis* that such a man would be appointed. He trusted that, under the guidance of their Lord Mayor, the right man might be chosen.—The Lord Mayor, in replying, said he had to fall foul of the proposer of the toast, because he differed *in toto* as regarded the appointment of an architect by the Corporation. He believed that it was better that, in the matter of architecture, competition should be open to all the architects of the city. He could not but think that it would be a loss to the community that there should be just one stamp put upon the buildings of Manchester. He went along with the members of the Society that there should be a wider view taken of what a great Corporation should do in the direction of matters pertaining to the architectural profession. They did not live in heroic times, and the Corporation was very largely governed by questions of rates, and however brilliant their fancy might be, they found that fancy very effectually curbed by the position in which the rates stood. At the same time, he believed that such a great community as Manchester might do great things for art, and he had some hopes that the time would come when the pursuit of the beautiful would not be dissociated from, but rather regarded as a handmaid to, the struggle for material comforts. Mr. Percy S. Worthington proposed the toast of "The Victoria University and Owens College," to which Mr. A. Hopkinson, Principal of Owens College, replied. The other toasts included "The Manchester Society of Architects," proposed by Professor Tont, and responded to by the President; "Our Hon. Legal Adviser," proposed by Mr. J. B. Gass, and responded to by Mr. W. Goldthorpe; and "The Hon. Secretary," proposed by Mr. John Ely, and replied to by Mr. Paul Ogden.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The second meeting of the Session was held on the 20th inst., Dr. W. de Gray Birch in the chair. At the Council meeting previously, Dr. Birch was unanimously elected hon. treasurer of the Association, in succession to Mr. Charles Lynam resigned. The Rev. R. I. Woodhouse exhibited an iron crucible weighing 6 lbs. 10 oz. bearing evidences of a hinge at one time existing, which was found at Merstham, in Surrey, not a great distance from the neighbourhood of the Sussex Ironworks, at which it had probably been made. He also exhibited a clay or terra-cotta money-box considered by Mr. Gould and others to be of early seventeenth century date. Miss Dobson brought for exhibition some brass and bronze coins, the finest being a brass of Lucilla, daughter of Marcus Aurelius, 147 A.D.; others were of Probus, Tetricus, and Galienus. Mr. Patrick, hon. secretary, made an exhibition on behalf of Mr. Chas. Lynam, and read some notes he had prepared in description of a fine series of photographs of the recent excavations and discoveries at Arbor Low, in Derbyshire. Mr. Andrew Oliver exhibited some curiosities from Russia, including a brass "icon" in three compartments, a brass figure of St. Michael with an inscription in Greek at the back, and a plaque of mother-of-pearl engraved with the "Nailing to the Cross." Mr. Thomas Fisher exhibited a large stone (porphyry) recently unearthed in Threadneedle-street, at a depth of 20 ft. below the surface, and Mr. Garside a photograph of a very fine celt in excellent condition, found at Rowarth, in Lancashire, and another of a so-called "Druid's Chair" from near Stockport. Mr. W. J. Andrew exhibited through the Rev. H. J. D. Astley a fine cinerary urn still containing cremated ashes, the urn bearing the inscription: "L·MVNIVS·PPRISCVS ALLIAE PRISCAE FILIVS ARTEMAE·NEPOS," which was found in the garden of Justinian, and was probably originally in a columbarium.—The paper of the evening was by Dr. Plowright, of King's Lynn, and was read in his absence by Mr. Astley. The paper dealt exhaustively with the "Archæology of Woad" from the earliest times down to the beginning of the nineteenth century. It was well illustrated by drawings and photos of woad mills and implements connected with its manufacture, both in this and other European countries, and references to the chief books upon the subject were given. The earliest references to woad as the source of a blue dye colour occur in the classics, the most familiar being that of Cæsar in his Commentaries. Pomponius Mela and Pliny also mention it. At the opening of a barrow at Sheen, near Hartington, some years ago a considerable quantity of woad-indigo was found in lumps and in powder—the sepulture probably being that of a dyer. Frequent reference is made in ancient documents to the sale of woad, or "wad," as it was then called, and still is by the woad grower of the fenlands of East Anglia. There is a roll preserved in the records of the borough of King's Lynn, dated 1243, setting forth the dues payable upon various commodities in which "woad" or "wad" is included. There is one locality in England where woad is still regularly cultivated for dyeing purposes, viz., the fenland districts of Cambridgeshire and Lincolnshire. An interesting discussion followed the paper, in which Mr. Forster, Mr. Gould, Mr. C. J. Williams, and others took part, the Chairman remarking that woad was at first called Glastum or Glast, Glastonbury—or with the Saxons, Glastingbury—having a reference to it; and at Bridgewater, in Somersetshire, there used to be a large trade carried on in woad.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday, in the County Hall, Spring-gardens, Mr. A. M. Torrance, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Islington Borough Council 5,811*l.* for electric light installation; Kensington Royal Borough Council 4,750*l.* for street improvement; and the Guardians of Poplar Union 4,775*l.* for the erection of officers' quarters at the workhouse.

The Council's Bricklayers.—Captain Swinton asked if Lord Welby had any further information to give the Council on the subject of the amount of work done by the bricklayers in the Council's employ.

Lord Welby, Chairman of the Finance Committee, said he would remind the Council that it was first stated there had been a considerable diminution in the work done, especially by the bricklayers, of late years. Last week he stated that the Works Sub-Committee had made inquiries on the subject, and up to a certain point they came to the conclusion that, so far as the evidence before them went, there had of recent years been a diminution in the amount of work done by the bricklayers, but that recently there had been an improvement. The Committee had continued its inquiries, and the result confirmed the general impression. But the circumstances varied considerably in the various cases before them, and it was impossible for them at the present moment to state in any specific form what the production had been, and what had been the increase of late. They were pursuing their inquiries, and would bring a Report up. There was one point he must notice. It had been stated that the laying of 330 bricks per day was considered a fair day's work for a bricklayer by the Council. He need hardly say that the Committee had never given encouragement of any sort or kind to such a limit as that. It was the desire of the Council to be a model employer, and that the wages given should be in accordance with the wages given by the best of employers. But if they gave good pay there must be some reciprocity, and a good rate of pay must be rewarded by a good rate of work, and to secure that they would give unwavering support to the Works Manager.

Captain Swinton asked if, in reporting, the Committee would go into the matter of other branches of labour besides bricklaying.

Lord Welby promised to take that question into consideration.

Inventions by Officials.—Considerable discussion took place on a Report of the General Purposes Committee dealing with an amendment of the Standing Orders relating to inventions by officials of the Council. The recom-

mendations of the Committee in effect prohibited any official or servant of the Council in future taking out a patent for any invention which is in any way connected with his official duties. Further, for any invention not connected with his official duties, an officer must obtain the consent of the Council before taking further steps other than taking a provisional protection.

Mr. Beachcroft moved an amendment to the effect that the Standing Order remains as at present, except that certain words be omitted.

The amendment was carried.

Working-class Dwellings.—A detailed return was made by the Housing of the Working Classes Committee, showing the receipts and expenditure in respect of all working-class dwellings and lodging-houses erected or owned by the Council for the year ending March 31, 1901. The dwellings mentioned in the account comprised 2,041 tenements, 305 cottages, and 324 cubicles, providing accommodation for 12,196 persons. During the year accommodation was provided for 2,608 persons, while since the closing of the account reported upon additional accommodation has been provided for 1,908. The gross income for the year was 44,226*l.* 12s. 3d., and of this 47·06 per cent. was required for outgoings, a slightly smaller percentage than in the previous year.

The report was adopted.

Tenders.—The following recommendation of the Parks and Open Spaces Committee was agreed to:—

"That the offer of Messrs. Flavell & Churchill (187*l.* 10s.) to supply certain piping, damper gearing, &c., to replace worn-out portions of machinery, &c., at the Battersea Park pumping station, and the offer of Messrs. C. Yates & Co. (133*l.*) to supply new boiler seating, engine foundations, &c., be accepted."

The Highways Committee recommended, and it was agreed,

"That Messrs. J. G. White & Co. be allowed to sub-let to the Anderston Foundry Co. the manufacture of the cast-iron yokes and road-boxes and of the other cast-iron work specified in the contract for the roadwork and platelaying in connexion with the reconstruction, for electrical traction, of the London County Council Tramways between (*a*) Westminster Bridge and Tooting, (*b*) Blackfriars-road and Kennington, and (*c*) Waterloo-road and St. George's-circus."

Appointment.—Mr. C. A. Daubney was appointed as a surveyor in the Architects' Department, on the recommendation of the Establishments Committee.

Post Office Telephone Charges.—The Highways Committee presented a report, and recommended that a copy of it should be sent to the Postmaster-General, "with an expression of the regret of the Council that the scheme of the Post Office telephone system for London does not establish real and effective competition, as recommended in the report of the Select Committee of the House of Commons of 1898, and does not secure to the public the advantages which they have been led to expect."

Mr. Benn, Chairman of the Committee, said he brought up the report with great regret. The Council had devoted ten years to endeavouring to secure for London an efficient telephone service at moderate charges, but they had been betrayed. The arrangements to be made by the Post Office were known to the National Telephone Company last September, and had the effect of forcing up their stocks to 366,000*l.* increased value; so that those who were "in the know" made a lot of money. Even now the Council would be happy to take over the Post Office telephone plant, and to supply London at provincial rates.

The debate was adjourned.

Piccadilly Widening.—The Improvements Committee reported the result of a conference with the First Commissioner of Works as to the proposed widening of Piccadilly from Hyde Park Corner to Walsingham House, and presented a modified scheme, extending only to that portion of the thoroughfare between Hyde Park Corner and Down-street. They proposed to cancel the Council's vote of 30,000*l.* for the complete scheme and to substitute an estimate of 13,536*l.*

After some remarks by Mr. Low, Mr. Campbell, and Mr. Davies (Chairman of the Committee), the modified scheme was adopted by the Council.

The Council adjourned at seven o'clock.

Books.

Brunelleschi. By LEADER SCOTT. (Great Masters in Painting and Sculpture.) London: George Bell & Sons. 1901.

WE are glad to notice any book that deals appreciatively with the life and work of a great man. In the textbook before us Leader Scott pays tribute to an architect of the very first rank—Filippo Brunelleschi. We know of no buildings more dominated by the individuality of genius than the churches of San Lorenzo and Santo Spirito. In these Brunelleschi established the form and detail now identified as the Italian Renaissance, although in their calm dignity and grace they are less Italian than distinctly Florentine. The capstone of his popularity, however, has doubtless been set by the dome which he reared upon Arnolfo's unfinished cathedral. The story of the dome is here written down for us with much interesting circumstance. The story of how Filippo took to his bed and left Ghiberti, his incompetent partner, to work out his own undoing, loses none of its relish by restatement. The struggles and differences between the architect, the opera, and the guilds are also retold. Whether the *Maestri di Pietra*, or Guild of Master Masons, was ever so responsible a body as we are invited to consider it, is open to question. The author hints darkly at co-operative building and the mysteries of Freemasonry. We see no reason, however, to attribute to the many what it is within the powers of one to accomplish. It is at least gratifying to note that Brunelleschi undeniably showed himself the master of the *Maestri* in this instance. The chapter referring to these events is entitled, "The Great Dome." It is, indeed, a great dome, but not so great a one as the author supposes. It has not a span of 200 ft. in diameter as stated. It is barely 140 ft. A mistake like this is a serious one, which might have been easily avoided.

The affectionate relationship existing between Brunelleschi and Donatello will always add a charm to the biography of either; and it was a fitting tie between the two men who moulded, in one case the architecture and in the other the sculpture, of the fifteenth century in Italy. The book is well illustrated.

The Art of Building a Home: A Collection of Lectures and Illustrations. By BARRY PARKER and RAYMOND UNWIN. London: Longmans, Green, & Co. 1901.

THE authors have in a series of essays or lectures endeavoured to cope with the unmeaningness of design and useless ostentation that characterise so many of our dwelling-houses. They have done so with a sincerity of purpose that we cannot but commend. If the essays have faults, they are the faults of enthusiasm. Yet we cannot help thinking that they would have been improved by a little more elasticity and a little less seriousness.

There is a reasonable halting place between the materialism of Mr. Whistler's famous "Ten o'clock" and the opposite extreme. Why, for instance, when discussing the relation of a house to its surroundings, should the authors tell us that "in the country certainly the low house is more successful, more in harmony with the scenery; perhaps because it is suggestive more of man's dependence upon nature, less of his defiance of her powers." The first portion of the sentence is obviously open to considerable extension and modification. A house which happily groups itself beneath the shelter of trees might appear insignificant when standing open on a plain; and although another, when perched upon a hilltop, might with propriety be unassuming in its sky lines, we have nevertheless seen a bolder treatment quite as successful. It is not an easy matter, we know, to develop statements within the limits imposed by a short essay, and a writer should therefore be the more careful as to the statements to which he commits himself. As for the reason given in support of the opinion we have quoted, we will only say that it had been much better left out.

It is reasonably insisted that a house, to be in any sense perfect, must be built to suit the habits and needs of those who inhabit it. We sometimes think, indeed, that the very whims and oddities of the occupier would have greater justification for expression than the whims and oddities of the architect, who has but a twelve months' acquaintance with his building. But since a house is built to last presumably for ninety-nine years, and will probably change hands more than once in that period, and since it cannot be all things to all men, it must become a glaring inconsistency if a certain moderation be not observed in the first place. Therefore, although originality in an architect is exceedingly desirable, good sense and moderation are equally so.

In the numerous illustrations with which the book is provided, there is ample evidence of originality on the part of the designer. Whether all the suggestions there shown, or referred to in the text, are to be desired is perhaps open to question. Although our authors, for instance, may have a preference for "the rich variety of colour and tone of light and shade of the naked brickwork" for interior walls, other folk may possibly find it most inconvenient for more practical reasons. It will hold the dust, it must soon become soiled and remain soiled, while a barked knuckle would be the least important injury that it could inflict. The edges of books, of furniture, would all suffer. We were about to add picture frames also, but pictures of any kind, we are told, look only less absurd on the walls of your house than they do upon the walls of an exhibition. Carpets are a further abomination. By such whims as these, the authors, as it seems to us, defeat their own ends. That a convenient and commodious living room should take the place of the three tiny "reception" rooms generally provided in the small house is reasonable enough. But we like, nevertheless, to see our favourite prints upon the walls, and enjoy the sense of warmth and colour, and, we may also add, quiet, which is lent by a carpet covering partially, at least, an expanse of oak floor. It is truly observed that the size of a room bears no relation to its cosiness. It is a quality conferred upon it by those who live in it. Yet the limitations imposed by the writers of this book will make it a more difficult matter than heretofore. There are one or two other points, we notice, which are likely to interfere with the comfort of the best of rooms. We question, for instance, whether a dog-grate could be satisfactorily put into so large a fireplace opening as in plate 16. Such grates require a great deal of humouring or they will smoke. We have also observed that exposed ceiling joists, with the ceiling contained between them, will buckle and crack the plaster, unless some binder takes the place of bridging, which is necessarily omitted.

However, the book offers so many suggestions to an intending home builder, that he must be content to take his risk with some of them.

Building Construction. By CHARLES F. MITCHELL, assisted by GEORGE A. MITCHELL. Third edition, thoroughly revised and much enlarged. London: B. T. Batsford. 1901.

THIS useful work, the third edition of which has just been published, has been further enlarged by a good deal of new matter and many new illustrations. The increase both in the number of illustrations and in their size is indeed the most prominent feature of the new edition. Several double-page plates have been added, among which, one, giving working-drawings of a large hammer-beam roof (of the Westminster Hall type), deserves special notice, as it ought to be of much interest and value to students. Even in this plate, however, objection must be taken to some of the detail, as being either badly placed or inharmonious—in short, as failing in the elementary grammar of design; but how such lame and tawdry "ornament" as some of that shown, for instance, in fig. 402, should be chosen to set before beginners for imitation, surpasses our comprehension. It is only fair to the authors of this work to say that they appear to aim at, and on the whole have been successful in maintaining, a somewhat higher standard of taste in their examples than is found in the other manuals of "Building Construction." As compared with those specimens of the very worst type of engineer's detail which the well-known "Notes on Building Construction" have rendered too familiar to many generations of students, with sad results on the vernacular building of the country, Messrs. Mitchell's drawings are, indeed, much to be commended. But they have need of improvement still in this respect; for to scatter broadcast as patterns—with the certain prospect of their repetition in thousands of

suburban houses—such abominably proportioned windows (no weaker word can describe them) as those of the "picturesque" cottage on p. 297 is, from an educational point of view, a serious fault.

With the same object, the sound instruction of youth, in view, and also in their own interests for the sake of a wider circulation, the authors may pardon the suggestion that they would do well, when next revising their work, to engage (besides an architect to prune and proportion their designs) some one conversant with common literary English, to correct and sometimes rewrite their letterpress. For it is a pity, indeed, that a work on which not only so much labour has been bestowed, but which is also so really good and valuable in many ways, should be marred by clumsy and faulty writing. Take the following passage, for example :—

"Fresco painting is a system of mural decoration in which pictures are painted on the finished surfaces of walls, with water-colours, which incorporates with the same."

This drawback must always prevent the work from gaining the high position as a text-book which it might otherwise take, for though the material is well worth making into a book, a real book it can hardly be called so long as it contains so much "specification" or "surveyor's English." There are many depths of bad English, but perhaps none so repellent and so painful to read as this particular jargon. In the preface to the present edition thanks are given to several persons for assistance in revision, and to one in particular "for his careful reading of the proofs." Seeing that the reader whose services are thus acknowledged is a member of a distinguished university, we can only suppose that he was restricted to testing the accuracy of the mathematical calculations (a most important point in itself), and that English grammar and spelling were not in his brief.

Among the new features of the work which should be mentioned are, as stated in the preface, that "advantage has been taken of American experience in iron and steel manufacture and in construction, and of Scotch practice in modern stonework," and that "many of the more important and pertinent by-laws of the Local Government Board and London County Council are included." Also that "in most trades a typical specification, approved by some important public body, has been inserted." The chapters that have been most largely added to are those on materials, foundations, vaulting, dome and bridge construction, roof coverings, wood roofs, joinery, and sanitation.

The work seems now to have reached its limit of thickness with respect to convenience, and if further additions have to be made, the authors should look to the abandoning of useless matter ; for instance, there could be no loss in omitting such things as the two rather unpractical fire-resisting floors which take up the best part of pp. 387-8, one being an invention of Viollet-le-Duc, never probably used in this country, and the other a quite obsolete system, employing joists of cast-iron. We trust that in the next edition, whenever it may be called for, the authors will not be content with additions and slight corrections only ; but that they will instead make searching amendments throughout the work, so as to bring it up to that higher level of merit to which, with such a good solid substructure as it already possesses, it might with comparative ease attain.

First Stage Building Construction. By BRYSSON CUNNINGHAM, B.E., A.M.I.C.E. (The Organised Science Series.) London : W. B. Clive.

AN examination cram-book of the barest and dullest type this little volume appears to be from first to last. There is nothing whatsoever original about it, and when the field is already so much better occupied, it is cause for wonder why such an unnecessary publication should be produced. It gives the impression of someone without the slightest interest in building having "got-up" to order a number of old South Kensington Examination papers, and then compiled a key to them. These papers are themselves responsible, of course, for the many useless and ridiculous things which the young student of building is expected to be acquainted with, as well as for the omission of several very elementary and quite essential matters which he is oddly supposed to have nothing to do with. But even when writing with such standards in view, an author with any enthusiasm for his subject would contrive to bring in a little reasoning and suggestion of better things into his text, together with something better than the hackneyed drawings which have done duty in so many previous manuals. But there is no trace in this work of any attempt or even desire to lift the student's view a hair's-breadth out of the Board of Education rut; it is merely a collection of routine statements, throughout which the word "is" refers to things solely as they appear in the examination syllabus, not as they either are or ought to be in reality. According to his lights, the author has performed his duty faithfully, accurately, and to the letter, but we should be sorry to recommend the work to architectural students as being likely to lead them in the right way.

Primer of Geometry, Comprising the Subject Matter of Euclid I-IV. Treated by the Methods of Pure Geometry. By H. W. CROOME SMITH, B.A. London : Macmillan & Co., Ltd. 1901.

FOR many years past the feeling has been more or less prevalent that the accepted versions of Euclid do not constitute entirely satisfactory aids in the teaching of geometry. Many of the defects and difficulties that puzzled students of a bygone generation have been eliminated from various modern text-books, but much that is illogical and inconclusive still remains, even in some so amended treatises. Mr. Croome Smith believes the time has come for the presentation of "a reconstruction of the subject which it is claimed is much more than a mere revision of Euclid's system, while it in no way strains those principles which mathematicians are agreed in recognising as axiomatic." In attempting a reconstruction, the author tries to avoid the points in which the system of Euclid is at fault. For example, in Book I. he teaches the theory of parallel and inclined lines and rectilinear figures without making use as Euclid does, of the circle, with whose properties the student is not supposed to be acquainted. No one will question the argument that it is doubtful logic "to make use of the circle in the early stages, and subsequently to use the properties thus demonstrated of lines, angles, &c., in demonstrating the properties of the circle." Teaching on such lines is distinctly cyclical, like that in many spelling books where the meanings of words are concealed by correlative definitions. Again, the author is correct in characterising as illogical the assumption that recognition of a theorem can be dependent on any particular method of carrying out a construction. The consequences of supposing the theorem to be dependent upon the problem are that theory becomes involved and circuitous, and that inconvenient methods for the solution of problems are encouraged.

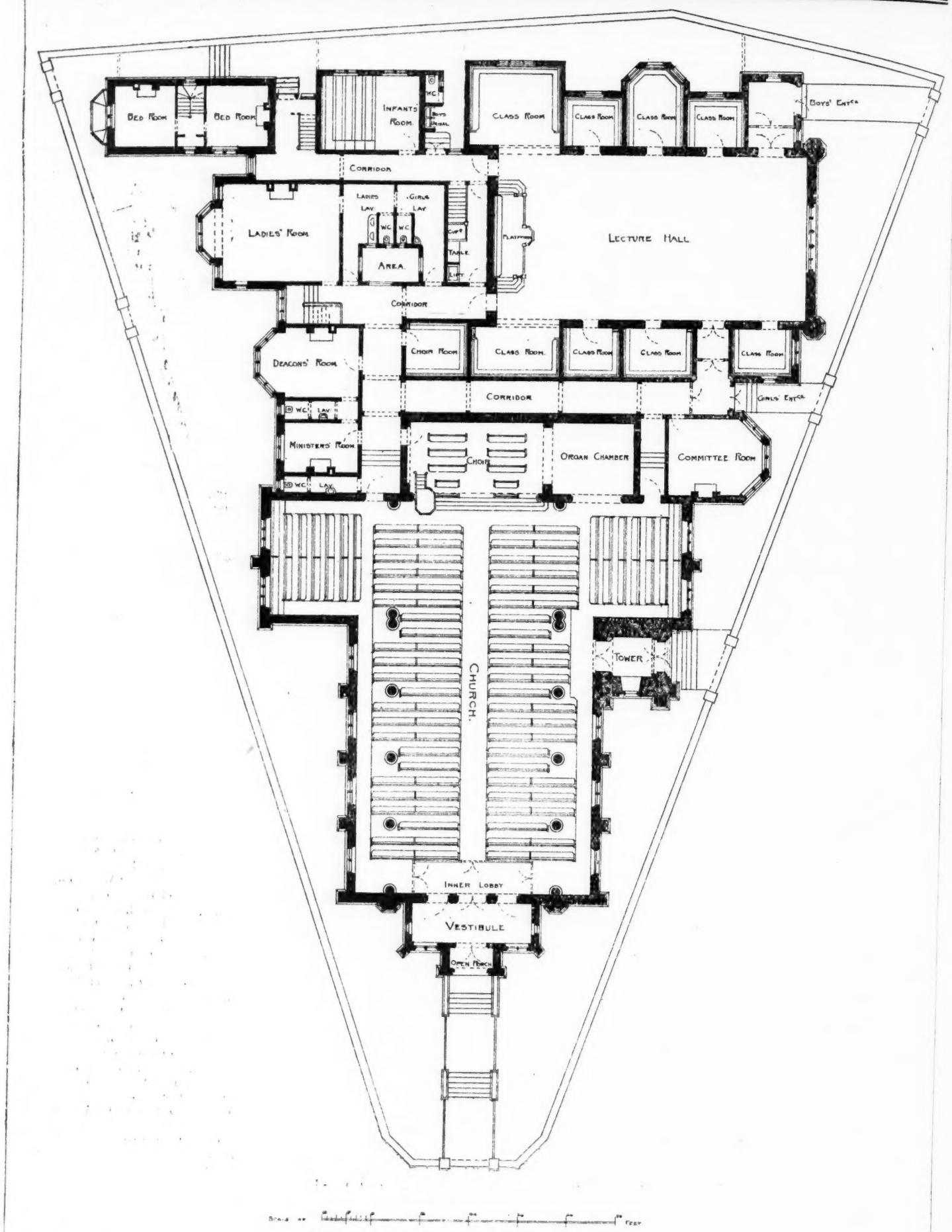
Mr. Croome Smith defers problematic construction until theoretical principles have been discussed in logical order in his Books I. to III. The student, therefore, reasons with representative points and lines, and his mental exercise is untrammelled by practical considerations. Finally, when the book of problems is reached, he will find the methods to be fairly in agreement with those adopted in actual practice. In the three first books of the primer the whole theory of Euclid I.-IV. is included, all theorems of similar character being brought together as far as possible, and generally converse theorems are included as one proposition. This treatment is useful, conducing both to logical consistency and to brevity. The latter quality is further aided by the employment of simple, precise, and intelligible definitions in substitution for the less direct phraseology sanctioned by long use. In his definition of a straight line, the author includes the idea of direction, thus suggesting a sight along the line to find whether it is "one which lies evenly between the two extreme points." The innovation appears to be good, and more likely to aid the conception of a straight line than the device sometimes proposed of applying a flat ruler to a line drawn on paper. The idea of motion is advantageously introduced into definitions of the angle and the circle. According to the author an angle is to be measured by "the amount of revolution of a straight line when turned about the vertex in the plane of the lines from the one to the other." Thus, a right angle nvolves one quarter of a revolution, an angle of two right angles is formed by one half of a revolution, and an angle of four right angles results from a complete revolution. Inasmuch as the straight line that revolves must be terminated by a geometrical point, we get at once the conception of the circle from the definition of the angle of four right angles. Further, the idea of revolution in connexion with an angle leads to the consideration of an angle which is greater than one of two right angles. Architects, engineers, and surveyors —the latter especially—do not regard an angle as a dead corner formed by two set lines, but as the outcome of motion. This being so, the author is strictly logical in asking why writers should pretend to exclude the idea of revolution from elementary geometry. The term "structure," as used by the author, seems conveniently to denote any combination of lines and angles, or anything constructed, and the term "magnitude" is only employed by him in its abstract sense. "Duplicate" is a term chosen to designate such structures as are equal in all respects. Everybody knows what it means, and it is effectively applied to the proof of certain theorems in the present primer. Many beginners have racked their brains over such expressions as "parallelograms about the diagonal of a parallelogram" and "the complements of the parallelograms about the diagonal." In such geometrical figures there is nothing difficult; the only thing in the way of comprehension is the luxuriant language in which their definition has been hidden. The method of treatment followed in the four books is distinctly original, and it will be found an interesting study to compare the demonstrations of the author with those contained in any standard version of Euclid's Elements. From what we have already said, it will be understood that the arrangement of the propositions is by no means identical with that of Euclid, and we notice that in many cases two or even three propositions are included in one demonstration. If the present attempt at reconstruction should be favourably received, the author promises to extend the scope of his primer. That the book will serve a most useful purpose in further suggesting the need for reform, we do not for a moment doubt, but the work of altering established methods of teaching is a stupendous task, which the most sanguine can hardly hope to accomplish within the limits of a lifetime.

Modelling: A Guide for Teachers and Students. By ED. LANTERI, Professor of Sculpture at the Royal College of Art, South Kensington; with a Preface by ONSLOW FORD, R.A. London : Chapman & Hall. 1902.

IT would seem almost superfluous to praise a guide to modelling by Professor Lanteri. In this work the student may follow the whole process through a series of remarkable photographs from the construction of the armature to the finished state of the figure or bust. The building up of the muscles and prominences, with the added vigor of the thumb marks left upon the clay, is presented in the various stages of progress, the student being thus led forward step by step. Plate 14, which shows the first stage in modelling a mouth, is a typical example of the method employed throughout the book. "Leave your work in such a state that it will interest you when you take it up to-morrow" was the wise advice once given us. Undue haste in the endeavour to obtain a finished effect will take all the life out of the clay. Professor Lanteri shows us how interesting the phases or stages may be made, while he makes it evident that there is but one way of achieving the desired end. He insists that a knowledge of anatomical form must in the first place be mastered, and the reason of these forms, or the student will become involved in those "unreasoning alterations which are always tried when this branch of instruction has been neglected."

There must be few who will not recognise the truth of this criticism, or be unable to recall the tedium of those "unreasoning alterations" by which they have endeavoured to rectify some short cut to proficiency.

STATION HOTEL, NOTTINGHAM.—The Victoria Station Hotel at Nottingham has just been completed. The new hotel is situate in the heart of the city, immediately adjacent to the Great Central Railway. The architect was Colonel Edis.



Congregational Church and Schools, Leeds. Plan.

Illustrations.

CENTRAL HALL FOR NEW CITY OF LONDON SESSIONS HOUSE.

IN our issue for June 30, 1900, we gave the elevations and plans of Mr. Mountford's competition design for the new Sessions House, together with an interior view of the central hall as then intended.

The present illustration, from a drawing which was exhibited at the last Royal Academy, shows the central hall design as remodelled and in our opinion very much improved. The dome is now a circular one on pendentives, in place of an octagonal one carried on squinch arches over a square plan. The first design was more novel and unusual, but this has much more breadth and unity.

The central dome is 37 ft. square on plan and 66 ft. high above the floor, the main cornice being 41 ft. above the floor. On each side of the central dome are lower ones 27 ft. square on plan, the three making a hall 104 ft. long, from which the four courts are all directly entered. The floor and lower portion of the walls will be of marble.

CONGREGATIONAL CHURCH AND SCHOOLS, WOODHOUSE-LANE, LEEDS.

THE church, which is now in course of erection on a site in the centre of a residential population, together with the school and class-rooms which were opened last month, will

form a complete and compact block of buildings well adapted for the purpose intended. The ground covers 2,700 square yards, and is situated at the junction of two wide thoroughfares, slightly rising. All the rooms are on the same floor, except part of caretaker's house and kitchen, &c.

The church has been planned with wide nave and narrow aisles, transepts, chancel, and organ-chamber. It is 95 ft. long, 48 ft. wide, and 82 ft. across transepts, and is capable of seating 760 adults. At the junction of the streets an open porch with inner vestibule is placed, over which is a seven-light traceried window terminating in a gable with angle turrets. At the junction of the nave and transept next Woodhouse-lane is placed another entrance, over which the tower and spire rises to the height of 130 ft. At the end of the chancel another seven-light traceried memorial window is placed, to be filled with stained glass.

The school or lecture-hall is connected with the church by two wide corridors, and is 64 ft. long, 34 ft. wide, and 26 ft. high, well lighted by a five-light window at the front and clearstory windows at sides; with eight classrooms at sides (those near the rostrum can be thrown open to the schoolroom when required). A ladies' parlour, 30 ft. by 24 ft., is conveniently placed with all necessary conveniences. Pastor's, deacons', and choir vestries, and infants' room are also provided.

The buildings are erected of pitch-faced wallstones and fine sandstone dressings, all outer walls lined with brick, all internal woodwork of pitch pine unvarnished, the roofs covered with the best dark Westmorland slates, all windows filled in with leaded lights, and the whole building lighted by electricity. The cost of the building, exclusive of land and fees, &c., is 14,800*l.*, and the principal contractors are Messrs. C. Myers & Sons, masons, and Messrs. H. Atkinson & Sons, joiners, both of Leeds, and the whole is from the design and carried out under the superintendence of Mr. G. F. Danby, architect, of Leeds.

RESIDENCES NEAR LONDON.

THE three houses illustrated have recently been erected on the Kelsey Manor Estate, Beckenham, Kent, and in the rear or west side overlook the charming park and lake.

The general contractors were Messrs. Syme & Duncan and Messrs. Popeland & Son, of Beckenham. The architects were Messrs. Thomas Archer and Francis Hooper, of London.

CATESBY HOUSE STABLES, NEAR DAVENTRY, NORTHANTS.

THESE stables were erected for Mr. Henry A. Attenborough in the centre of a very favourite hunting country, and so arranged that, in case of need, the coach-houses could be converted into additional loose-boxes.

Ample space is provided for washing both horses and carriages under cover. A separate room is built for drying saddles and horse-clothing apart from the harness. There is a smithy next the loose-boxes, an isolated box in case of sickness, and an estate carpenter's shop over one of the coach-houses. The head groom's rooms are over the harness-rooms, &c., and the turret contains large storage tanks.

The buildings are in close proximity to the site of Catesby Abbey, and the water supply is obtained by force-pumps from the fishponds which were formerly part of that establishment.

The general contractors were Messrs. G. & H. Bywaters & Sons, of King-street Regent-street, W. The architects were Messrs Thomas Archer and Francis Hooper, of London.

A DECORATIVE PAGE.

THIS piece of work illustrates two pages of an illuminated copy of the old French romance "Aucassin and Nicolette," which Mr. Cowlishaw is writing out and decorating in this form with a view to its being subsequently bound by Mr. Cobden Sanderson.

The romance was probably composed about the beginning of the thirteenth century. Nothing is known of the author, but the book is one held in much respect by students of old literature. The single manuscript known to exist is preserved in the Bibliothèque Nationale at Paris.

The musical notation in the verse sections is a transposition from the notation in the edition of MM. Moland and d'Hericourt, and known as that of Franco of Cologne, who probably lived about 1250.

The version here given is translated from the old French by Mr. F. W. Bourdillon, from whose notes this information is given.

SOME EXAMPLES OF METALWORK.

THE articles shown in this plate are designed by Mrs. Starkie Gardner, who is giving special attention to the class of furniture illustrated here, with a view of introducing articles of this kind combining artistic design with moderate price.

The locks, finger-plates, and handles are executed in brass, pewter, copper, or iron, all hand hammered. The brass rim lock is intended specially to go with oak doors. The pendant for a billiard-room was a special commission carried out to order.

The style of Mrs. Gardner's work, as will be seen, is picturesque and artistic, while avoiding the eccentricity into which recent designers have sometimes run in their search after novelty in work of this class.

APPLICATIONS UNDER THE 1894 LONDON BUILDING ACT.

THE London County Council on Tuesday dealt with the following applications under the London Building Act, 1894. Unless otherwise stated, consent was given on conditions. The names of applicants are given between parentheses :—

Lines of Frontage and Projections.

Brixton.†—A chapel, with buttresses, at St. Gabriel's Training College, Cormont-road, Camberwell (Mr. P. A. Robson for the Rev. Canon C. E. Brooke).—Consent.

Westminster.—A porch at the entrance to Members'-mansions, No. 36, Victoria-street, Westminster (Messrs Ardron & Dawson for Mr. J. Browne Martin).—Consent.

Hackney, South.—The retention of two projecting entrance staircases at the schools on the north side of Cassland-road, Hackney (Mr. T. J. Bailey for the School Board for London).—Consent.

Width of Way.

Whitechapel.—The retention of a building used as a urinal on the south side of Corbet's-court, Little Pearl-street, Whitechapel, with the external walls of such building at less than the prescribed distance from the centre of Corbet's-court (Mr. J. Tickle for Mr. E. Bell).—Consent.

Means of Escape from Top of High Buildings.

Westminster.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the Act on the seventh, eighth, ninth, and tenth stories of the easternmost portion (described as Block A) of the residential flats with shops on the ground floor, known as Park-mansions and situated on the south side of High-road, Knightsbridge, between Brompton-road and Knightsbridge-green (Mr. G. D. Martin for Messrs. A. Kellett & Sons, Ltd.).—Consent.

Westminster.—Means of escape in case of fire proposed to be provided in pursuance of Section 63 of the Act on the eighth and ninth stories of Blocks A, B, and C of St. James's-court, Buckingham-gate, Westminster (Mr. A. Blackford for Mrs. Leeds).—Consent.

The recommendation marked † is contrary to the views of the Local Authority.

BOOKS RECEIVED.

MANCHESTER: THE CATHEDRAL AND SEE. By the Rev. Thomas Perkins, M.A. (Geo. Bell & Sons.)

MEDIÆVAL LONDON. By W. Benham, F.S.A., and Charles Welch, F.S.A. (Seeley & Co.)

VILLAGE CLUB, BLAGDON, SOMERSETSHIRE.—On the 23rd inst. the Right Hon. Lewis Fry formally opened the clubhouse which Sir W. H. Wills has provided for the village of Blagdon at a cost of upwards of 2,000*l.* The club is situated in the centre of the village. It is a domestic Gothic structure, with half-timber work above the ground floor. The building is two stories in height, and is built of native stone. On the ground floor are the reading-room and library, the former being 30 ft. by 18 ft., and 12 ft. high, whilst the latter is 20 ft. by 18 ft, and of the same height. A staircase leads from the hall to the upper rooms, which are of the same dimensions as the lower, one being intended for the billiard-room, the other the games-room. The architect is Mr. Frank W. Wills, of Bristol. Messrs. J. & C. Clark, of Rickford, were the builders.

Correspondence.

To the Editor of THE BUILDER.

THE "CA' CANNY" (GO-EASY) QUESTION.

SIR,—In reference to the *Times* article and your comment thereon, permit me to say, that having been in the building trade (boy and man) for forty years, as apprentice, journeyman, foreman, clerk of works, and manager, I have come to the conclusion that many, if not most, of the charges against the men are utterly void of foundation. Masters are frequently prejudiced by interested persons in authority, who shield their own neglect and deficiencies behind the men. The incompetence, most rife in the building trade, lies not in the *labour* so much as in the supervision. Incompetent foremen; incompetent estimators, or, as they now style themselves, surveyors; clerical routine, instead of practical execution; a smattering of technical knowledge instead of experience; these are the evils of the building trade, and coupled with trading on borrowed capital, or working the jobs on the strength of the "draws," constitute the real crisis. How many real builders are there, either in town or country, to-day?

Then, again, the "too old at fifty" business is another curse. Personally, I am a better man now as regards ability and power to carry out works than ever; but I am obliged to work at "half-cock" because masters and public bodies look askance, and in effect say, "grey hairs are upon you," a biblical reference with which all employers are doubtless familiar. Investigate by all means, but begin at the right end. I hold no brief for trades unionism. I am not, and never was, a member of any trade combination; but I flatter myself that, allowing for the increase in the rate of wages, without either bullying or dancing attendance on the clerk of works at the bar of a public-house, I can get work done as cheaply now as twenty years ago. I say work, because the 1,000 or 1,200 bricks referred to were practically tumbled in from a barrow.

As I read the signs of the twentieth century, it appears that the day of the "big contractors" is gone. The day of the specialist has come. Except for the use of scaffolding and hoisting machinery, is there any job which could not be worked by a manager for the architect and client as effectively as a manager or foreman now does it for a builder? With a reliable man, and a depôt for the hiring of scaffolding, &c., and the working of stone by stone firms and joinery by joinery firms, the real practical builder could be on the works; the staff regulated by the size of the job. The architect would then be in touch with his work without the intermediary either of a capitalist or a clerk of the works. Perhaps, as John Bright said of politics, so of building—the time may come when an honest man may engage in it; until then, perhaps, I shall only be "one of the young men who dream dreams."

ONE FROM THE BENCH.

*** There may be a good deal of truth in our correspondent's letter, but it does not touch the main point of the discussion—are men compelled or persuaded to do far less work in a day than they could do and used to do, at the orders of and in the interests of the trade-unions?—ED.

ROOD SCREEN, ST. DENYS', SLEAFORD.

SIR,—In your issue of November 16 appeared a plate of the above screen, and on the top was the following lettering, "Drawn by Mr. Herbert Kirk, Diocesan Surveyor, Sleaford."

I beg to point out that the drawing was executed solely by me, and that the words referred to should never have been inserted. Mr. Wilfrid Bond assisted me to measure it, but beyond that it was my work entirely. C. H. LANFEAR.

*** The words were inserted by us to complete the title in the usual way by giving the draughtsman's name. We received the drawing from Mr. Kirk, and certainly were under the impression that it was his own. Perhaps Mr. Kirk can throw some light on the matter.—ED.

PRESERVATION OF OLD BENCH ENDS.

SIR,—At Packington Church, in Leicestershire, some very interesting fifteenth century bench-ends have been brought to light. They had been buried in damp mould; and one or two of them are in a condition that makes them like hardish putty. Can you or any of your readers suggest any treatment which would harden and preserve them without destroying their present beautiful colour and surface? HENRY PROTHERO.

PROPOSED THEATRE, MANCHESTER.—It is stated that proposals are on foot for the erection of a new theatre in Manchester. The site suggested is the rectangular piece of ground lying between the Refuge Insurance Buildings, in Oxford-street, and the Manchester South Junction and Altrincham Railway line. The name of Mr. Alfred Darbyshire is mentioned as the architect.

The Student's Column.

GAS AND GAS FITTINGS.

21.—The Properties and Manufacture of Calcium Carbide.

PROPERTIES OF CALCIUM CARBIDE.—Calcium carbide is a dense solid compound of calcium and carbon. Its chemical formula is CaC_2, which indicates that it consists, when pure, of 62·5 per cent. by weight of calcium combined with 37·5 per cent. of carbon. It is neither explosive nor inflammable, and may be strongly heated in an open fire or in a gas flame without undergoing any change. When exposed to the atmosphere, calcium carbide, like a lump of quicklime, slowly changes into a bulky powder. This change of condition is due to the water vapour in the air. The hydrogen of the water vapour enters into chemical union with the carbon of the carbide to form the inflammable gas acetylene, which continues to escape into the air so long as any undecomposed carbide remains exposed to its influence; at the same time the oxygen of the water vapour combines with the calcium of the carbide to form calcium oxide, or quicklime, which in turn combines with a further quantity of atmospheric water vapour to form calcium hydrate or slaked lime.

When liquid water is poured upon calcium carbide, or the carbide is dropped into water, the same reactions occur as when the carbide is exposed to the atmosphere, but they take place at such a rapid rate that the decomposing carbide becomes more or less strongly heated, and acetylene gas is evolved in a brisk stream.

Absolutely pure calcium carbide will yield 5·82 cubic feet of acetylene per pound of carbide decomposed, but with commercial carbide of good quality the average yield of acetylene does not exceed 5 cubic feet per pound, and with inferior carbide or with generators of an inferior type the yield often falls considerably below this volume.

Moissan has shown that pure calcium carbide is white and transparent, but the carbide of commerce is neither pure, transparent, nor white. Commercial calcium carbide is usually either a dense agglomeration of opaque iridescent crystals, or a compact semi-crystalline mass of bluish-grey or grey-black colour. It has a semi-metallic appearance and resembles granite in hardness. Its density is 2·22. The difference in the physical condition of different samples of commercial carbide is caused by variations in its rate of cooling from the fused state in which it is formed in the furnace, and also by variations in the nature and quantity of the impurities present. Comparatively large crystals are formed when the carbide cools slowly, and small crystals when it cools rapidly. The colours are mainly due to the presence of iron as an impurity in the raw materials employed. Black particles of carbon which have not united with calcium to form carbide are also frequently present. No reliable indication regarding the purity of carbide is afforded either by its colour or by the size of its crystals.

The Electric Arc.—If a wire through which a strong electric current is passing be severed, and the severed ends remain within a short distance of one another, the current will leap across the space by which they are separated, and its passage will be accompanied with the evolution of light. If a rod or pencil of carbon be attached to each of the ends formed by severing the wire, and the tips of the two pencils be brought in contact and then drawn a short distance apart a dazzling light will be at once emitted. The evolution of light is due partly to the ends of the carbon pencils becoming incandescent, partly to the electric arc which is produced as the electric current leaps from one carbon pencil to the other, and partly to small particles of carbon which flow with the current from one pencil towards the other, and which become heated to incandescence in the arc. The end of the positive carbon emits a more brilliant light than the end of the negative carbon, and after a short period it becomes slightly flattened and has a small hollow or "crater" formed in it. It is from this crater that the whitest and most intense light is emitted.

The appearance of the electric arc and carbon pencils is shown in fig. 53, which is reproduced from a photograph for the use of which the writer is indebted to Professor Vivian B. Lewes, and it will be seen that while the positive pole becomes flattened, the negative pole becomes more pointed.

When the ends of the carbons are too close together a hissing noise is produced, and if they are a little too far apart a roaring noise is

Fig. 53.—The Electric Arc.

emitted and the evolution of light is apt to suddenly cease, owing to the failure of the current to effect a junction between the two carbons. When the carbons are a suitable distance apart the combustion of the carbons

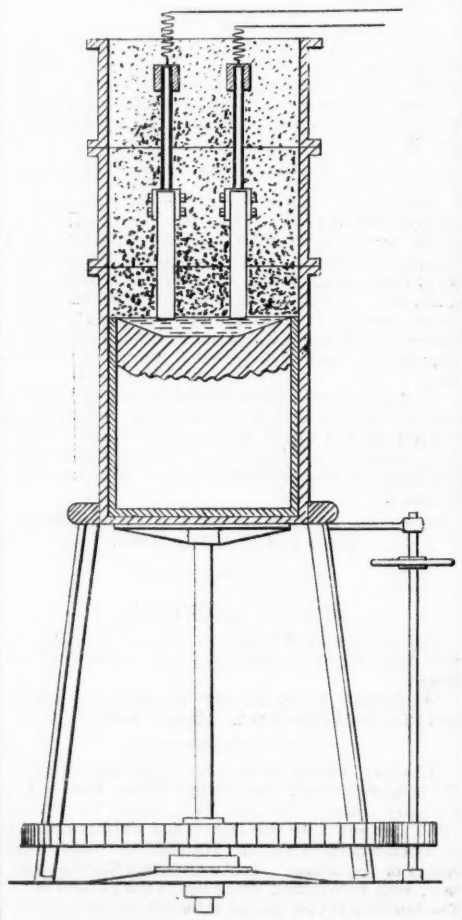


Fig. 54.—Electric Furnace for Producing Calcium Carbide.

and the passage of the current should proceed silently, and be accompanied by the evolution of a brilliant and steady light. The value of the electric arc for the manufacture of calcium carbide is, however, not due to the evolution of light nor to any influence peculiar to electricity, but merely to the fact that the temperature of the arc is much higher than that obtainable by any other known means.

Electric Furnaces.—The temperature of the electric arc has been found by experiment to be 3,500 deg. C., and by enclosing it in a chamber having infusible non-conducting walls the useful appliance known as an electric furnace is constructed. Electric furnaces have been employed for scientific research work for a long period, but it is only within the last quarter of a century that they have become of great industrial value. Lewes divides electric furnaces into two classes:—

1. Those in which the substance to be heated is placed in the path of the electric arc, or is made to form one or both poles for the formation of the arc, and

2. Those in which the heat is generated by offering resistance to the flow of current, as when a piece of thin platinum wire is heated to incandescence by making it the link between two copper wires of greater diameter through which the current is passing.

For the manufacture of calcium carbide on a large scale, furnaces of the arc type are always employed. It would serve no useful purpose to describe each of the numerous designs for electric furnaces which have been patented for the manufacture of carbide, and a brief description of one of the arc furnaces (fig. 54) recently invented by W. S. Horry, of Niagara, must serve as a type of carbide furnaces in general, but further information relating to calcium carbide and the various furnaces which have been employed for its manufacture can be obtained by reference to Professor Lewes' exhaustive treatise on acetylene.

In the Horry furnace (fig. 54) the carbon pencils are placed in parallel vertical position, and are buried in the mixture of lime and carbon to be converted into calcium carbide. When the arc is produced between the lower ends of the two pencils the mixture in the neighbourhood of the arc fuses and is converted into a pool of liquid carbide. A portion of the superimposed mixture then falls into the liquid carbide, which spreads laterally until it passes beyond the field of reduction and solidifies. That portion of the solid mixture which has fallen into the molten carbide is acted upon by the electric arc, and is itself speedily converted into molten carbide. In this manner all the mixture in the lower part of the furnace is gradually converted into carbide. In order to bring the upper layers of mixture into the field of the arc, mechanism is provided whereby the furnace may be moved vertically downwards, so that the carbon pencils, which remain in a fixed position, may occupy a higher position in the furnace.

The chemical name for quicklime is calcium oxide, and when a mixture of ground coke and lime is subjected to the heat of the electric arc the carbon contained in the coke and the calcium contained in the lime enter into chemical combination to form calcium carbide, thus:—

CaO	$+$	$3C$	$=$	CaC_2	$+$	CO
Quicklime	+	carbon	yield	calcium carbide	+	carbon monoxide

The foregoing chemical equation shows that, theoretically, 56 parts by weight of quicklime will combine with 36 parts of carbon to produce 64 parts of calcium carbide and 28 parts of carbon monoxide. The carbon monoxide is a poisonous, inflammable gas, which burns at the mouth of the furnace, or may be utilised to assist in maintaining the high temperature of the furnace. In practice the lime and the carbon employed are never pure, and it is necessary to ascertain the proportion of the impurities present in them by chemical analysis, and to make allowance for them when calculating the relative proportions of lime and coke to be employed in the mixture to be converted into calcium carbide.

There are two forms of carbide on the market, known respectively as "ingot" carbide and "run" carbide.

Ingot Carbide.—When powdered lime and coke, mixed in the correct proportions for carbide manufacture, are heaped around the carbon poles in an electric furnace, that part of the mixture which is in closest proximity to the electric arc fuses and becomes converted into calcium carbide, but the outer portion of the mixture is not heated to a sufficiently high temperature for conversion into carbide. When the electric current is cut off and the material within the furnace is allowed to cool, the whole of it is found to have become conglomerated

into one compact mass or "ingot," consisting of a core of high-quality calcium carbide with a crust which contains less and less carbide as its distance from the core increases.

The entire ingot as it leaves the furnace contains about two-thirds of its weight of commercially pure calcium carbide, while the remaining one-third consists of "crust," and contains a large proportion of lime and carbon which have escaped conversion into calcium carbide. When the ingot is broken into small lumps for distribution to consumers the worst portions of the "crust" are picked out, but a considerable amount of material, consisting partly of carbide and partly of useless lime and carbon mixture, is blended with the purer carbide. Occasionally a sample of carbide, consisting mainly of "crust" and yielding only about one-half of the normal quantity of acetylene, is found on the market.

Run Carbide.—If an excess of lime be added to the carbon and lime mixture to be converted into carbide, the additional lime acts as a flux, and renders it possible to convert the whole mixture into a molten mass, which may be run out of the furnace into suitable moulds. When producing ingot carbide the temperature of the furnace becomes so high that the furnace lining is rapidly destroyed, and it is found that by using an excess of lime and producing run carbide the destruction of the furnace lining is less rapid. Run carbide is more uniform in composition than ingot carbide, but as it contains an excess of lime it will not yield so large a volume of acetylene as the best selected ingot carbide. When, however, the crust obtained with ingot carbide is mixed with the core of the ingot the mixture may be of less value than run carbide. Every consumer who uses carbide in considerable quantity should provide himself with some means of ascertaining the volume of acetylene evolved from a definite weight of the carbide supplied to him, and should insist that the price of the carbide be regulated by its quality.

Protective Coverings for Carbide. — Many attempts have been made to protect carbide from the influence of atmospheric water vapour without interfering with its utility for the production of acetylene by contact with liquid water. The carbide has been soaked in glucose, which was intended to provide a coat which would be impervious to the atmosphere, but which would dissolve as soon as the carbide was immersed in water. The carbide has also been treated with liquid petroleum, paraffin-wax, tallow, and other substances of a like nature, the object in some cases being merely to retard the rate of evolution of the gas when the carbide was brought in contact with water. In other cases the carbide has been sealed in metal cartridges to be dropped into the water and then perforated with a suitable pointed tool.

The steeping of carbide in glucose, oil, or wax does not protect it efficiently from the action of atmospheric water vapour, for if a sample of carbide so treated be exposed to the air for a week, it will be found to be more or less completely decomposed. The sealing of the carbide in metal cartridges is not convenient when the gas has to be generated in comparatively large quantities, and the preservation of the raw carbide in stout metal drums with air-tight lids remains the best and safest method of storage.

OBITUARY.

MR. F. WILD.—The death is announced of Mr. Fred Wild, architect, of Bradford, which occurred at his residence, Farcliffe Place. The deceased, who was a native of Halifax, came to Bradford with his father in early youth, and was articled to Mr. Samuel Jackson, J.P. Among the local buildings of which he has been the architect is the Bradford Conditioning House, in course of erection; the East Ward Conservative Club; and the caretaker's lodge at Chellow Heights. Mr. Wild was a bachelor, and was forty-nine years of age.

THE CENTRAL LONDON RAILWAY (NEW LINES).—The company have prepared a Bill for powers to construct a line which will in effect complete the circle, or rather oval, of their present railway and enable them to run the trains continuously. The new line from Shepherd's Bush is planned to take a route to Old Broad-street by way of Kensington, Knightsbridge, Piccadilly, the Strand, Ludgate-hill, Queen Victoria-street, and Leadenhall-street, with two subways—one from Surrey-street, Strand, to Victoria Embankment, the other from Bennet's-hill to Paul's Stairs by the riverside.

GENERAL BUILDING NEWS.

ST. OSWALD'S, METHLEY, LEEDS.—This church was reopened on October 26, after the partial completion of very extensive repairs. The whole building, constructed of Oulton stone, has suffered so much from weather, smoke, and perhaps chemicals, that most of the old surface had perished entirely, in many places to a depth of 7 in. or 8 in. The parapets had mouldered away, the buttresses in some cases had separated from the walls, and the spire was dangerous. To a great extent the church has now been repaired with hard Derbyshire stone, the spire was taken down and rebuilt, the tower made good, and the surface of the walling on the south side attended to, an open drain being formed all round the building. Inside, the church has many features of interest, including one very fine window of fifteenth-century glass, and a good screen of the same date. Foundations of a Saxon building were discovered across the west bay of the nave, part of the north wall being supported on them. Plain floors of red squares and black and white marble have been laid down, new oak choir-stalls erected, and the old seats refixed. Two arches open into the temporary organ-chamber. The seventeenth-century pulpit and font-canopy are repaired, and the lectern (of German design) cleaned from varnish. A figure of St. Oswald which was over the south porch door has been brought into the church as it was perishing; also two effigies, which stood in the north porch, have been once more made recumbent in openings prepared for them in the walls, strips of copper recording their "translation" in the following words:—

RECTORIS IGNOTI EFFIGIEM SUCCESSOR HIC PONI CURAVIT. MDCCCCI.

SERVUM TUUM NOBIS IGNOTUM DOMINE CUSTODI.

The lower part of the walls, disencumbered of thick modern plastering, displayed in places some interesting paintings, but most of the original surface had been hacked away. The Jacobean altar is kept in use, surmounted by a large red marble slab. Much remains to be done, especially on the north side, before the church is once more weatherproof. The architects are Messrs. Prothero & Phillott, of Cheltenham, and the builders Messrs. Collins & Godfrey, of Tewkesbury.

CHURCH, ILFRACOMBE.—A new church is to be built at Ilfracombe on the site of the present St. Peter's. Mr. G. H. Fellowes Prynne, of London, is the architect.

PRESBYTERIAN CHURCH, STANLEY, DURHAM.—The foundation-stones of a new Presbyterian church at Stanley, county Durham, have just been laid. The buildings are being erected from the design and under the superintendence of Messrs. Badenoch & Bruce, architects, Newcastle-on-Tyne, and comprise a church to seat 350, hall seated for 230, with vestry, class, and session-rooms. The walls are of local stone, with hammer-dressed facing, and having chiselled dressings. The site is on the brow of the hill to the east of Stanley, and on the north side of the main road from Shield-row. The church is planned with wide nave and no aisles, and has vestibule porch at entrance, with tower and spire. The hall and classrooms are at the east end, and the hall gable abuts on the main road, with the porch at one side giving access to same, and answering as an exit from the church. The timber work throughout will be of pitch pine, stained, and the floors will be in wood blocks laid on concrete. The contractors are: Wm. Johnson, White-le-head, mason; John Anderson, joiner and slater; Matthew Charlton, plumber; Richard Frankland, Blackhill, plasterer; Adam Robertson & Sons, painters and glaziers; and heating, Messrs. Emley & Sons, Ltd., all of Newcastle, except the mason and plasterer.

CHAPEL, PANBRIDE, FORFARSHIRE.—St. Bride's Chapel was opened on the 12th inst. The chapel accommodates 404 persons, and is situated at the intersection of Carlogie-road and Maule-street. It consists of a nave and side aisle with raised chancel at the east end, from which an organ-chamber is divided by an arch. At the west end there is a font recess, with dressed stonework and tiled walls and floor. The roof is of open timber work, and the aisle is divided from the nave by wooden pillars and trussed timbering. The architects were Messrs. James Maclaren & Sons, Dundee, whose design was chosen in competition.

STORES, YORK.—A branch of the York Equitable Industrial Society, Limited, has just been opened at the corner of Vyner-street and Haxby-road. Mr. Beck was the architect.

FACTORY, BRISTOL.—A new factory for Messrs. Pearson, Huggins, & Co. has just been built on a corner site at the junction of Mivart-street and Cato-street, Eastville. The area of the floor space available is slightly over an acre, and at least 1,000 workers will be employed. In the basement is a fireproof storeroom, which is lighted by Luxfer prism windows. There is a lift from this store to the other floors. The ground, first, and second floors will be used for the making, finishing, and packing of the army, railway, police, and tramway clothing. The whole premises are lighted by electricity and warmed by hot water, the apparatus for the latter being supplied by Skinner & Co. The contractor for the general work is Mr. Longden, of Eastville, and the architects are Messrs. La Trobe & Weston

BUSINESS PREMISES, ABERDEEN.—Work in connexion with the suite of new offices at Broadford Works, Aberdeen, for Messrs. Richards, Ltd., is now nearing completion. The new building, which is 112 ft. in length, is erected on the site of the old offices, which were found to be insanitary and unsuitable for the business. Plans for the new premises were prepared by Mr. R. G. Wilson, architect, Aberdeen. The accommodation consists of a manager's and board room (in which the meetings of the directors will be held), an assistant manager's room, a counting-house (33 ft. in length by 30 ft. in breadth, occupying a central position), a room for the typists, and a large office, with gatekeeper's premises, waiting-rooms, and lavatories. There are three built safes in connexion with the different departments of the work, and also a large safe on the basement floor underneath the counting-house for the storage of books and papers. A central hall running throughout the building gives access to the various rooms.

NEW BUILDINGS, EDINBURGH CASTLE.—The finished drawings of the new buildings which are to be erected in Edinburgh Castle are now on view to the public in one of the committee-rooms of the City Chambers. They have been prepared at the War Office under Major Hemming, R.E., and show a building of the Castellated or Scottish Baronial style of architecture, providing officers' messroom accommodation and quarters for seventeen officers and their servants. The new structure, which is 124 ft. long and 100 ft deep, is for the most part two stories in height, but the fall in the ground at the north side is utilised for the kitchen, cellars, offices, and servants' quarters, and that part of the building is thereby increased to four stories. The site is on the old Mills Mount, to the immediate east of the recently-erected military hospital, and the barracks now occupying the site will be demolished to make way for the new quarters, the design of which is in harmony with the architectural features of the existing building. On entering the Castle, the new building will be to the right, after passing the Argyle battery. The ground floor, which is entered through a vestibule and hall—in which there is a recess for the band—will contain the principal apartments, including mess-room, ante-room, billiard-room, and the usual mess offices, which communicate with the kitchen by a separate staircase and lift. On the north side of the entrance are suites of rooms for two field officers, one on the ground floor and the other on the upper flat, with separate entrances, and the rest of the building is devoted to bedroom accommodation. In front of the mess there is a terrace, with a stone parapet, and on the north side a spacious flat over the billiard-room commands a view of Princes-street and the Fife coast. The contracts have not yet been let, but it is understood that they will be placed with local firms, and the probable cost is estimated at about 20,000*l.*—*Scotsman.*

NEW LIBRARY FOR LEWISHAM.—On the 23rd inst., Mr. T. W. Williams, Mayor of Lewisham, opened to the public a new central public library, which has been erected in the High-street, Lewisham, close to the parish church, at a cost of nearly 8,000*l.* The building is in the Renaissance style, and is built of red brick, with terra-cotta dressings, from the designs of Mr. A. R. Hennell. The builders were Messrs. Black & Son, of Forest Hill. In the hall is a bronze tablet to the memory of Alfred the Great.

WORKHOUSE, WORMWOOD SCRUBBS.—An ordinary fortnightly meeting of Hammersmith Board of Guardians was held on the 20th inst., at the Guardians' offices, Fulham Palace-road, when it was stated that the Building Committee had considered the Board's reference of the question of the formal appointment of Messrs. Giles, Gough, & Trollope as architects in connexion with the erection of the new workhouse and infirmary at Wormwood Scrubbs. Having had an interview with representatives of the firm, the Committee recommend that Messrs. Giles, Gough, & Trollope be appointed as the architects. To this the Board agreed.

NEW FIRE-STATION, BARNSLEY, YORKSHIRE.—An inquiry was held at the Town Hall, Barnsley, on the 21st inst., by Mr. A. A G. Malet, M.I.C.E., an Inspector of the Local Government Board, into a proposal of the Town Council to borrow 1,800*l.* for a new fire-station and firemen's houses, and 408*l.* for the improvement of the road at Shaw-lane. The Borough Surveyor, Mr. J. H. Taylor, explained what was proposed.

SANITARY AND ENGINEERING NEWS.

ELECTRIC LIFTS FOR GREENWICH FOOTWAY TUNNEL.—There will be two electric lifts, one at each end of the tunnel, each of which will be capable of carrying about seventy passengers at a speed of 180 ft. per minute. The lifts will travel about 44 ft. and 50 ft. respectively. In order to reduce the current required, the cage and half its load will be balanced by a cast-iron weight. The cages will be of strong construction, having steel suspension frames with the lower parts filled with panelling of contrasted woods. The upper half will be finished with ornamental ironwork. Each cage will be fitted with automatic safety gear arranged to stop the car if the speed exceeds a fixed limit. The cages (and balance weights) will

run on steel rails milled to gauge to ensure easy running. Each car will be suspended by eight flexible steel wire ropes, the ultimate strength of all the ropes being twenty times the maximum load that they have to carry. The driving gears will be made to Björnstad's patents and fixed overhead, so that only three pulleys are required for each. The motors actuate the driving pulleys through worm gear. The worms will be of mild steel gearing with phosphor bronze wheels with machine-cut teeth and enclosed in oil baths. The controlling gears are constructed under Björnstad's patents, all the switches required for starting and stopping the motors being actuated by powerful magnets, which are controlled by the attendant in the cage through a small switch. Messrs. Easton & Co. are the engineers.

THE MANCHESTER WATER SUPPLY.—The Manchester Waterworks Committee met on the 21st inst., and decided to remove all restrictions upon the water supply under their control. The effect of recent heavy rains has been, not indeed to fill the reservoirs at Longdendale, but so far to fill them as to make the question of a water famine rather remote. The Committee, having dealt with the question of the immediate supply of water, next turned their attention to the question of the laying of the second pipe from Thirlmere, and it was decided that tenders for laying the first section, namely, that between Prestwich and Hoghton, near Blackburn, be advertised for. There will be fourteen miles of cast-iron pipes 44 in. in diameter, and ten miles of similar pipes 40 in. in diameter, with three-quarters of a mile of steel pipes to be used in carrying the line over bridges. The use of steel pipes for this purpose is at present purely experimental, and they are therefore to be placed in such a position as shall be easily accessible. The Committee have not at present absolute faith in this, fearing that the steel pipes will be more liable to corrosion than pipes made of cast-iron. It is for this reason that steel pipes are only to be brought into requisition to such a limited extent.—*Manchester Guardian.*

FOREIGN.

FRANCE.—A historical exhibition of wood-engraving is to be held at the Ecole des Beaux-Arts during this winter. It is to include examples of French and foreign wood-engraving from the commencement of the art to the end of the nineteenth century.——An exhibition of the ceramic work of M. Lachenal is open at the George Petit Gallery, Paris. It includes a great deal of fine work in stone-ware, faïence, and enamel.——The "Alliance Provinciale des Industries d'Art" has decided on the formation, at Nancy, of a school of theoretic and practical instruction in applied art, to include wood-carving, metal-work, textile art, ceramic art, and other artistic industries.——M. Ch. Gozier, architect, of Rheims, has been elected President, for 1902-3, of the Société des Architects of the Marne; and M. Etève has been elected President of the Société at Nantes, for the same period.——The decorative panels executed by M. Cheret for the Hôtel de Ville of Paris, and which represent Pantomime, Dancing, Comedy and Music, are about to be placed in position. They will be framed in white wood borders picked out with gold. The scheme of decoration will be completed by four smaller panels over the doorways, consisting of figures of children and various symbolic attributes.——The death is announced, at the age of sixty, of M. Paul Emile Sautai, painter, and pupil of Jules Lefebvre and of Robert-Fleury. He was a painter of landscape and *genre* pictures many of which have found places in provincial art museums, and in the Luxembourg are his two pictures "Interior de l'Eglise de Lavardin," and "Souvenir de Rome." He had received medals in various successive Salons.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. C. J. Innocent, architect, of Sheffield, has taken into partnership his son, Mr. Charles Frederick Innocent, who is an Associate of the Institute of British Architects.——Messrs. Mansell & Mansell, architects (Birmingham), have removed from Imperial Chambers, Colmore-row, to No 47, Temple-row, Birmingham.——Mr. Joseph Berry, architect (Huddersfield), has removed his offices to 3, Market-place, Huddersfield.——Messrs. Denny, Mott, & Dickson (London) have been appointed sole agents in Great Britain for compo-board.

GLASGOW ARCHITECTURAL CRAFTSMEN'S SOCIETY.—The usual fortnightly meeting of this Society was held on Friday, the 22nd inst., Mr. James McKissack in the chair, when a paper entitled "Foreign Competition in the Building Trades" was read by Mr Geo. Herbertson, measurer. He held that the restriction put by the combined action of workmen on the importation of foreign-made joinery finishings and the like was contrary to the spirit of free trade, which is the policy of this country. He suggested that for rolled steel beams and Portland cement a certain standard should be specified, and let the material come from where it might. He deprecated the proposed boycotting by slate quarry masters in their attempt to keep out foreign slates. A discussion followed. On Saturday, the 23rd inst., the members of the Society visited the lodging for men known as "Whitehouse," situated at Springburn. The promoters, a syndicate under the name of "The St. Mungo Boarding House Company," are to be congratulated on their very effective solution of the problem of providing home comforts for the working classes in an establishment, palatial in its construction, and such as to promote the health and happiness of its inmates, at a cost which must be considered to be extremely reasonable. The idea of the management is not so much to cater for the single-night lodgers as to provide for permanent or weekly boarders. For the modest sum of 13s. 6d. per week a working man has his breakfast, dinner, tea, and supper served in a dining-room, large, airy, and well lit, on tables laid with spotless tablecloths, and waited on by civil attendants. His evenings, if he be of a literary turn, he can spend profitably in the library. The buildings reflect credit on the architect, Mr. Whitey, of Glasgow, treated as they are in an artistic fashion combined with strict economy in their design. The walls are constructed of brick, rough-cast cement on face, with red-tinted cement as dressings. The floors are fireproof, and the buildings are lighted throughout by electric light. Steam is employed in the cooking arrangements, and the laundry work and cleaning is accomplished by the most improved machinery.

THE CARPENTERS' COMPANY'S EXAMINATIONS.—This Company held their annual examination in sanitary building construction at their Hall during last week. The Board of Examiners included Professors T. Roger Smith and H. Robinson; Mr. John Willson, the Master of the Company; Mr. Slater, Vice-President of the Institute of Architects; Mr. Seth-Smith, President of the Architectural Association; Dr. Wynter Blyth, Medical Officer of Health of Marylebone; Mr. Chas. Wall, President of the Institute of Builders; Mr. Bartlett, of King's College; and Mr. S. Green, President of the Clerk of Works' Association. The following is a list of successful candidates arranged in order of merit: F. Hartnoll, special prize of books (as he already holds the Company's silver medal); H. Barsby and H. German (equal), silver medals; G. H. Lovegrove, E. W. F. Martin, and A. Norton (equal), bronze medals; H. Walker, H. Bolton, J. Sandham, C. W. Woodhouse, A. B. Harvey, E. A. Crane, G. J. Boog, J. Lawrence, and W. M. Couper, certificates.

APPOINTMENT OF SANITARY OFFICER.—The Local Government Board has sanctioned the appointment of Mr. H. E. Cox as a sanitary inspector in Stoke Newington.

SCHOOL OF ART WOOD-CARVING.—The School of Art Wood-carving, Imperial Institute, South Kensington, has been reopened after the usual vacation, and we are requested to state that some of the free studentships, maintained by means of funds granted to the school by the Technical Education Board of the London County Council and by the Drapers' Company, are vacant. The evening class is, for the present, closed, but to meet the requirements of those professionally engaged during the week, a special Saturday afternoon class is held. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

INCORPORATED CHURCH-BUILDING SOCIETY.—This Society held its usual monthly meeting (the first of the present session) on Thursday, Nov. 21, at the Society's House, 7, Dean's-yard, Westminster, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz.:—Building a new church at Stoughton, Emmanuel, near Guildford, 50*l.* for the first portion, and towards enlarging or otherwise improving the accommodation in the churches at East Bridgford, St. Peter, near Nottingham, 25*l.*; Hednesford, St. Peter, near Stafford, 70*l.*; Ickham, St. John the Evangelist, near Dover, 25*l.*; Manningtree, St. Michael and All Angels', Essex, 25*l.*; Tetbury, St. Mary, Gloucester, 20*l.*, in lieu of former grant of 10*l.*; West Dereham, St. Andrew, Norfolk, 25*l.*; Weston-super-Mare, St. Saviour, Somerset, 60*l.*; and Worlington, All Saints', Suffolk, 25*l.* Grants were also made from the special Mission Buildings Fund towards building Mission churches at Eastcombe, near Stroud, Gloucester, 15*l.*; New Catton, St. Luke, Norwich, 30*l.*; Newton, near Burton, Pembroke, 20*l.*; and Steelworks, near Ebbw Vale, Monmouth, 20*l.* The following grants were also paid for works completed:—Roath, St. Martin, Cardiff, 1,000*l.*; Grove, St. James, Wantage, Berks, 50*l.*; Woolmer Green, St. Michael and All Angels', Welwyn, Herts, 80*l.*; Little Bowden, St. Nicholas, Northampton, 35*l.*; Great Saughall, All Saints', Chester, 50*l.*; Heysham, St. John, Lancaster, 150*l.*; Worlington, All Saints', Suffolk, 15*l.*; Greenhead, St. Cuthbert, Carlisle, 30*l.*; Croydon, St. Augustine, Surrey, 150*l.*; Stow Longa, St. Botolph, near St. Neots, Hunts, 25*l.*; Compton Dundon, St. Andrew, Somerton, Somerset, 25*l.*, Hetton-le-Hole, St. Nicholas, Durham, 100*l.*; South Witham, St. John the Baptist, Grantham, Lincs, 25*l.*; Sidcup, St. John the Evangelist, Kent, 100*l.*; Thaxted, St. John the Baptist, Essex, 20*l.*; Pontardulais, St. Michael and All Angels', Glamorgan, 110*l.*; Wetley Rocks, St. John, Stoke-on-Trent, 20*l.*; Latchford, St. Hilda, Warrington, 15*l.*; Leyton, St. Luke, Essex, 20*l.*; Willesden, St. John the Baptist, Middlesex, 50*l.* Dundraw Mission Church, Bromfield, Cumberland, 15*l.*; Cotteridge Mission Church, near Birmingham, 50*l.*; Stoke Newington, St. Faith, London, 35*l.*; Chapel St. Leonards, St. Leonard, Alford, Lincs, 15*l.*; Stirchley-street, The Ascension, near Birmingham, 200*l.*; Noman's Heath, St. Mary the Virgin, Tamworth, Staffs, 10*l.*; and Wendlebury, St. Giles', Oxon, 20*l.* on account of a grant of 25*l.* In addition to this the sum of 466*l.* was paid towards the repairs of twenty-seven churches.

ELECTRIC LIGHT POWER STATION, NEEPSEND, SHEFFIELD.—Mr. A. A. G. Malet, A.M.Inst.C.E., inspector under the Local Government Board, sat at Sheffield Town Hall on the 19th inst. to inquire into the subject-matter of the application of the Sheffield City Council for sanction to borrow 500,000*l.* for purposes of the electric lighting undertaking. Mr. S. E. Fedden is the electric light engineer.

CAPITAL AND LABOUR.

MILL-SAWYERS AND WOOD-CUTTING MACHINISTS' RULES.—The following are the new working rules which have been agreed upon between the representatives of the London Master Builders' Association and the Amalgamated Society of Mill-Sawyers and Wood-cutting Machinists:—1. That the working hours in summer shall be fifty per week for forty weeks. That during twelve weeks of winter, commencing on the second Monday in November, the working hours shall be for the first three weeks and the last three weeks forty-seven hours per week, and during the six middle weeks forty-four hours per week. *Summer* (for forty weeks).—First five days of each week, 6.30 a.m. to 8 a.m., 8.30 a.m. to 12 noon, 1 p.m. to 5 p.m. Saturdays, 6.30 a.m. to 8 a.m., 8.30 a.m. to 12 noon (equal to fifty hours per week). *Winter* (for twelve weeks).—For three weeks commencing the second Monday in November: First five days of each week, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon, 1 p.m. to 5 p.m.; Saturdays, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon (equal to forty-seven hours per week). For the next six weeks: First five days of each week, 8 a.m. to 12 noon, 1 p.m. to 5 p.m.; Saturdays, 8 a.m. to 12 noon (equal to forty-four hours per week). For the following three weeks: First five days of each week, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon, 1 p.m. to 5 p.m.; Saturdays, 7 a.m. to 8 a.m., 8.30 a.m. to 12 noon (equal to forty-seven hours per week)

2. That overtime, when worked at the request of employers, but not otherwise, shall be paid at the following rates, namely:—from leaving-off time until 6 p.m., ordinary rate; from 6 p.m. to 10 p.m., time and a quarter; after 10 p.m., double time. On Saturday the pay for overtime, from noon to 4 p.m., shall be time and a half; after 4 p.m., and Sunday, double time. Christmas Day shall be paid for the same as Sunday.—3. That one hour's notice be given or one hour's time be paid by either side, on determining an engagement.—4. That payment of wages shall commence at noon, or as soon thereafter as practicable, on Saturday.—5. That wages earned after leaving-off time on Friday, and Saturday only, shall be kept in hand as back time.—6. That the term "London District" shall mean twelve miles radius from Charing Cross.—7. Conciliation Rule.—(*a*) For the adjustment of all disputes and to avoid stoppage of work, it is agreed that upon a difference arising between an employer or upon the works of an employer and any of his workmen from any cause whatever, notice shall be given by the association or society of the complaining party to the association or party representing the other side, and the subject matter of dispute shall thereupon be referred to the Board of Conciliation, who shall be summoned within seven days, and, if practicable, shall give their decision within the next six working days, proceeding in the following manner: (*b*) For all purposes of the foregoing rules the Board of Conciliation shall consist of three members nominated by the employers and three by the workmen. Each party shall send to the other within one week from the date of signing these rules, and within one week from January 1 in each year, the names of six persons from whom three shall be selected to act as their representatives on the Board of Conciliation for the current year ending December 31, and in the event of the death or resignation of any member, either party shall appoint another member within one week, notice being given thereof. The number of representatives of the employers and of the workmen on the Conciliation Board shall always be equal and shall be so maintained during the sitting. (*c*) The Board of Conciliation so constituted, if unable to agree, shall make application to the Board of Trade under the "Conciliation Act, 1896," or apply for the appointment of a person to act as a conciliator. The Board of Conciliation shall have power to decide all questions arising between the employer and the workmen, including any questions between one trade and another as regards demarcation of labour or other matters, provided that for the decision of any question involving claims or rights of other sections of the building trades a Joint Conciliation Board shall be constituted of the three representatives nominated by each trade involved and by a similar number of representatives of the employers, so that members on the Joint Conciliation Board may be specially represented on such Board, and so that the numbers of representatives

of the employers and the workmen on such Joint Conciliation Board shall be equal and be so maintained during the sitting. (*d*) A Joint Conciliation Board shall have the like powers as a Conciliation Board, and be regulated in the same manner. (*e*) The Conciliation Board, or a Joint Conciliation Board, shall have power to make such rules and regulations for the transaction of business as they may approve. (*f*) In the event of an application being made to the Board of Trade, or a person being appointed as conciliator, the decision of such person or the Conciliation Board shall be final and binding on both parties. 8. That six months' notice on either side shall terminate the foregoing rules. (It is understood that the six months' notice shall not expire during the winter weeks.) Throughout the rules "employer" means a member of the London Master Builders' Association, and "workman" means a member of the Amalgamated Society of Mill-Sawyers and Wood-Cutting Machinists.

LEGAL.

A BUILDER'S APPEAL UNDER THE WORKMEN'S COMPENSATION ACT, 1897.

THE case of Veazey *v.* Chattle came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Stirling and Mathew, on the 23rd inst., on the appeal of the defendant (the employer) from an award of the County Court Judge of Derby, who had made an award in favour of the applicant under the Workmen's Compensation Act, 1897.

In this case the applicant was in the employ of the defendant, a builder, and met with an accident whilst doing some repairs to the roof of a house. It seemed that the applicant and another workman erected a ladder against the side of the building, and took what was called a "crawling-board" up the ladder for the purpose of doing the repairs. This board consisted of a plank 20 ft. in length and 10 in. wide, and it had nailed or screwed across it ridges of wood for the purpose of giving foothold to the man who was working on it, and at one end of the plank, on the underneath side, was another ridge for the purpose of hooking it over the ridge of the roof. The two men placed this board on the roof, but it was not in any way attached to the ladder. The applicant went up the board for the purpose of lifting the end of it over the ridge of the roof, the other man standing on the ladder and holding the board to keep it steady. Before the applicant had done what he intended doing the board slipped and the applicant fell and was injured. The County Court Judge found that the applicant was employed on, or in, or about a building which exceeded 30 ft. in height, and which was being repaired by means of a scaffolding within the meaning of the Act (Section 7), and awarded the applicant compensation. From this decision the employer now appealed, on the ground that the County Court Judge was wrong in holding that the ladder and "crawling-board" constituted a scaffolding within the meaning of the Act.

At the conclusion of the arguments of counsel, the Master of the Rolls, in giving judgment, said that the decision of the House of Lords in the case of Hoddinott *v.* Newton, Chambers, & Co. was clear authority for saying that that which would not ordinarily be called scaffolding might be scaffolding within the meaning of the Act. Was it possible to say as a matter of law that this arrangement could not be a scaffolding within the meaning of the Act? It seemed to his Lordship that it fulfilled the purpose for which it was used—viz., the repair of a building—as well as did the trestles and boards in the cases cited during the arguments. It was a platform which was used by a workman in order that he might get on with his work. It was a special contrivance such as was usually adopted for the purpose of allowing a workman to work safely in a position at a considerable height from the ground, and it afforded a means of supporting him for doing his work in the same way as the trestles and boards which had been held to be scaffolding. It seemed to his Lordship quite clear from the decisions of the House of Lords that a ladder might be scaffolding within the meaning of the Act. He thought that the arrangement in this case answered to the description of scaffolding, and that the County Court Judge had come to a proper conclusion on the matter, and that the appeal ought to be dismissed.

Lord Justice Mathew concurred.

Lord Justice Stirling, however, dissented. The question to be determined was whether the structure which was used in this case could in the language of Lord Brampton in the case of "Hoddinott *v.* Newton, Chambers & Co." be called scaffolding, or in the language of Lord Lindley, could fairly be called a scaffolding. To his mind it could not. It seemed to him to be a form of ladder, and when the accident happened the board had not been put in position. In his opinion, the combination could not either fairly or properly be called a scaffolding. He therefore thought that the appeal ought to be allowed.

By a majority of the Court, therefore, the appeal was dismissed, and the decision of the County Court Judge affirmed.

Mr. Ruegg, K.C., and Mr. Cranstoun appeared for the appellant (the employer), and Mr. Chester Jones for the applicant (the respondent on the appeal).

IMPORTANT CASE UNDER THE PUBLIC HEALTH ACT, 1875.

THE actions of Wigham, Richardson, & Co., Ltd., *v.* the Walker-on-Tyne Urban District Council and of the District Council against Wigham, Richardson, & Co. came before Mr. Justice Farwell in the Chancery Division on the 26th and 27th insts.

Mr. Cripps, K.C., Mr. Macmorran, K.C., and Mr. Gatey were counsel for the company; and Mr. Robson, K.C., and Mr. R. J. Parker for the Urban District Council. The case of the Council was given priority to by the Court.

Mr. Robson, in opening his case, said that his clients were the Urban District Council of Walker, in the county of Northumberland, and the defendants were manufacturers and engineers at Walker; and this action was brought under Section 26 of the Public Health Act, 1875, which enacted that any person who in any urban district without the written consent of the Urban Authority causes any building to be erected over any sewer of the Urban authority, or causes any vault, arch, or cellar to be newly built or constructed under the carriage-way of any street shall forfeit to the Urban Authority 5*l.*, and 40*s.* for every day after written notice has been given on behalf of the Urban Authority; and the Urban Authority may cause any building, vault, arch, or cellar constructed in contravention of this section to be altered, pulled down, or otherwise dealt with as they might think fit, and might recover the expenses of so doing. This was what the defendant company objected to, but the Council maintained that the company, having erected a vault, arch, or cellar, the Council were entitled to pull it down or dispose of it as they thought fit. The Council were also the public electric lighting authority. In April last it was reported to Mr. Laycock, the Council's Surveyor, that the defendants were building, without the consent of the Council, a tunnel under Fisher-street. The defendants' works were on both sides of that street, and they wanted the two sides connected for the purposes of their works. The Council were responsible not only for the sewers which they might hereafter lay down, but also for the electric lighting if they might wish to lay it down; and they did not wish a tunnel of 12 ft. high put down in this street which might interfere with their own operations hereafter. Notwithstanding that, the defendants persisted in continuing to construct this subway, and while the construction was going on subsidences of the roadway began to take place, and one of the water pipes was sprung, leaked, and the water began to wear away the soil from under the gas pipes. The Council said that this must not go on; and they claimed the right under the Statute to deal with the matter as they thought fit. But the plaintiffs went on with the work to carry their electric mains from one side to the other. Wigham, Richardson, & Co. were large shareholders in the Gas Co., who had powers to supply electrical energy outside this area. Within this area the legislature had given the Council powers to supply electrical energy, but Wigham, Richardson, & Co. took their electrical energy from the Gas Co. at present, and desired to have it extended to the other side of the street—both sides being within the Council's district. The Council submitted that although they could not prevent Wigham, Richardson, & Co. laying this tunnel under their own premises, they could prevent them constructing it under the public thoroughfare. The defendants had filled up the tunnel to some extent, and said that there was no longer a vault or tunnel under the street. But they had not removed the structure. On the contrary, they had left it more dangerous than ever, by filling up the space above the wires with ballast instead of concrete or material homogeneous with the surrounding soil or rock. The Council's Surveyor advised them that in consequence there would be a continuation of the subsidences, and that the Council would be unable to lay drains down this street.

Mr. Thos. Wm. Laycock, Surveyor to the Urban District Council, gave a description of the character of the tunnel or arch.

Mr. Cripps, for the company, said that after all they only wanted to get at the point of law. The Urban Council seemed to fear that they would lose for electric supply purposes the business of Wigham' Richardson, & Co., whose works gave employment to over 3,000 persons. For those works the company wanted to get the polyphase system, and to do that they had to go under the highway; but, having had their attention drawn to the matter, they destroyed the arch, leaving the pipes or wires to pass through the concrete casing. All the District Council were entitled to under the statute was to get rid of the arch, but not to remove the electric wires. Yet they had proposed to dig down and cut those electric wires under the guise of filling up this arch; and against that Wigham, Richardson, & Co. got an interim injunction, as they had no right to cut this electrical connexion. While the company had been wrong in constructing an archway, and had admitted that, they were still entitled to restrain the District Council from taking up those mains, pipes, and electrical wires, which was now the only bone of contention.

After further argument, his Lordship, in giving judgment, said that the view he took of this case was that it turned on a question of fact, viz., whether the pipes in question were a structure or situated in any structure which the District Council were entitled to remove under Section 26 of the Public Health Act. The first action was by the Local Authority claiming a declaration in accordance with that section, and to that there was no defence at all, because nobody disputed that the Local Authority had that particular statutory right. But the company admitted that they brought a cross action to restrain the Local Authority from interfering with the pipes. The company were lessees of forty-four years unexpired of the land on both sides of Fisher-street. The subsoil of the street, therefore, at the *locus in quo* belonged to them. Wigham & Co., being owners on both sides of the street, were minded to take their electric cables from their property on one side to their property on the other. Had Wigham & Co., being owners, simply drilled a hole through the subsoil, and thrust a pipe through from one side to the other, there could have been no interference by the Local Authority. But they had built a tunnel with an arched roof and sides and floor of concrete. Such a structure required the written consent of the Urban Authority before it was built, and as it was not so obtained the Urban Authority had the right to have that structure removed. Having made that tunnel the company changed its plans, and instead of laying their pipes in the interior of that tunnel they cut away the centre of the concrete floor down to the clay and laid their pipes on the clay; and on the top of them the concrete was filled in again to the height of the original flooring. The Local Authority wanted to cut those wires on the ground that they were part of the floor of the arch, vault, or cellar, that they were entitled to remove the floor, and, inasmuch as these pipes were in or under the floor, they were entitled to remove the pipes also. In his lordship's judgment the place where the pipes were now laid was no part of the floor of the vault as built, and no part of a vault, arch, or cellar under the statute. The District Council succeeded in their claim for a declaration of their rights under the Section, and Wigham & Co. would have to pay the costs of that action. In the cross action, Wigham & Co. succeeded, and there would be an injunction to restrain the District Council from cutting, disturbing, or damaging the pipes or mains, the Council to pay the costs of that action.

RECENT PATENTS:

ABSTRACTS OF PATENTED INVENTIONS.

13,544.—CEILINGS AND FLOORS: *E. L. Ransome*—After a plastic or concrete ceiling has been moulded in place upon false work, the flooring is finished; short legs serve to sustain the core-boxes, which, until the cement has become set, are braced in position; then, when the boxes have been taken away, the floor is laid either over temporary frames or over permanent centres. For the metal coils (see No. 13,279 of 1900), which may join the parts as they are moulded in turn, the inventor substitutes hard porous earthenware or concrete blocks, laid over the webs and rebated to support the centres.

13,563.—A PRESSURE REGULATOR FOR GAS: *F. Ackermann*—A regulator for gas burners comprises a cylindrical case containing a cup fitted with a conical needle, as the gas raises the cup the needle tends to reduce in extent the gas-passage into the burner above, the cup being weighted to suit the normal pressure; a base-plate forced downwards with a helical spring may replace the cup.

13,591.—WINDING MACHINERY FOR LIFTING PURPOSES: *F. Eastmead and A. C. Moffatt.*—A lever that moves against a spring displaces lengthwise a shaft which carries a winding drum having conical ends. On the shaft runs loosely the driving wheel, which is prevented from moving sideways with a flange and a clip. On one side of the frame is affixed a brake-cup, and a brake-cup is fashioned on the pulley; when the spring comes into play, the drum is moved to engage with the brake, but when it is displaced towards the right-hand it will become engaged for winding with the pulley.

13,596.—SPIRIT AND OTHER LEVELS: *F. A. Brownell.*—Flanges are fashioned upon the outside and inside of the casing, which also has an internal screwed collar for pressing the container up against the cover. A small opening, to be closed with a screw, serves for the pouring in of the fluid.

13,602.—DECORATION OF CEILINGS, WALLS, AND SIMILAR SURFACES: *H. Schudt.*—Layers of quickly drying plastic material, wherein wire, string, shot, or other filling has been embedded, are brushed on the flat surface with long-haired brushes; the plastic material is compounded of glue, melted resin, and a paste of chalk and water, to which, when cool, are added oil and colouring-matter, and, it may be, lime, wax, or shellac. The process is described as being available for imitation leading on glass with coloured transfers, as an imitation of stained glass.

13,633.—FOLDING GATES AND GUARDS: *F. Judd.*—Gates and guards for shop-fronts, windows, &c., have uprights that are joined together with lattice-work in the form of lazy-tongs, and consist of two

bars joined with pierced spacing-blocks which provide guides for the pins of lazy-tongs joints above and below. The amount of opening of the frame-work is regulated with pins or stop-blocks upon the end uprights, between which the lattice-bars are pivoted at the middle.

13,644.—A SOLDER FOR ALUMINIUM: *H. Lange.*—After the surfaces have been cleaned with a file they are coated with zinc as they are being heated, an alloy containing about one part of aluminium and two and a half parts of zinc is then spread over them and the surfaces, pressed together, are heated until the alloy is melted.

13,673.—A CONTRIVANCE FOR WINDOW-SASHES: *W. Cummings.*—For the turning inwards of sliding sashes a part of the inside bead is hinged, the parting is made detachable, and hinge eyes or sockets are either secured to the sashes for engagement with pivotted eyes, or fitted over pivots upon the frame. Bevelled pin-and-socket plates and a turn-buckle in engagement with a slotted plate on the bead, fasten the parting-bead, whilst a thumb-screw in a fixed threaded socket or nut secures the inside bead. For a lower-sash hinge is devised a T-shaped plate, upon the sash, having a lug and socket that will interlock with a flap which is pivotted on to the frame, and pivots upon the pulley-stile engage with socket-plates on the upper sash. A recess in the sash-stile contains a hook or button around which the sash-cord is looped, a fixed hook holds the detached cord when one turns the sash inwards.

13,694.—AN APPLIANCE FOR USE WITH DRAWING-SCALES: *E. L. Sykes.*—The inventor seeks to dispense with the use of compass dividers by fitting the drawing-scale with a movable pointer and a pointer fixed at one end of the scale.

13,703.—FLUSHING-APPARATUS: *R. Chantry & H. C. Milbank.*—Two tubes constitute a bell-siphon having its walls hollowed, a third tube is joined to the inner one of the two tubes, and is dipped into a stand-pipe. The third tube is also connected to a pipe at the base which leads into a cylinder containing a weighted piston; the piston, as it falls, causes the water to flow over the crown of the siphon whereby the flush is set in operation.

13,730.—CONTRIVANCE FOR HOISTING AND LOWERING PURPOSES: *R. Watson & C. E. Stevenson.*—A trolley, which carries the load, runs upon a rail which is to be raised upon a middle guide secured with brackets to the side of a building, when it has been lifted high enough the rail will form a connexion between fixed rails, on to which one can run the trolley; a spring-stop serves to prevent the trolley from running off too soon, and the winding-up of the rail too far is prevented with a lug that engages with the underside of the rail.

13,739.—AN APPLIANCE FOR DOORS, GATES, CASEMENTS, &c.: *D. Davis.*—A combined stop and holder consists of a curved metal plate, having its ends turned upwards, which is pivoted eccentrically and has an extension-piece for the control of its movement, the extension having a curved slot through which a pin is inserted. The edge of the door, as it is being opened, meets the end of the curved metal plate, and so turns the extension-piece into place for keeping the door opened between the ends of the plate.

13,750.—TILES FOR BUILDERS' USE: *F. Furness.*—Tiles for interlocking are fashioned with bevels so that they shall overlap with those next adjacent. They are bolted on to floors, walls, ceilings, and other surfaces, the bolts being fastened with screws and flanges, but for rubber tiles the bolt-heads are put into under-cut recesses. For the tiles see also No. 20,248 of 1894.

13,755.—FLUSHING APPARATUS: *W. Müller.*—Between a flange and lugs upon the bell is mounted a loose plate. As the bell rises the water will flow to beneath the plate through openings that are made in the bell between the lugs and the flange. The flush is started by the flowing of water over the crown of the siphon together with the fall of the loose plate.

13,793.—CONSTRUCTION OF CONCRETE WALLS, &c.: *E. L. Ransome.*—For adjusting mould boards or panels to the plumb-line are employed screws that will press against wedge-shaped or rebated braces, the panels, or cleats upon the boards, tie-bolts being passed through the boards and braces. Between the upper edges of the boards are inserted struts or distance-pieces, and on the outer sides of the adjacent boards are fitted turn-buttons that are pivoted to the boards.

13,796.—MEANS OF REGULATING WATER SUPPLY: *S. M. Rutnagur.*—For regulating the quantity of water delivered for flushing and other household or similar purposes, and for preventing waste, the inventor devises a screw-down or plug-valve, which is either closed automatically with a tippler or opened and shut with a handle. An outlet from the container communicates with a vessel fitted with an ordinary exit branch, and another that feeds water to the tippler, of which, when the valve is open, a weighted part will lie against a stop. The valve, when left opened, will become automatically closed after a certain known quantity of water has been supplied. For a spring push-valve an eccentrical disc for working the push is mounted upon the spindle.

13,805.—INSULATORS, &c., FOR ELECTRICAL CONDUCTORS: *G. Wright and C. Aalborg.*—The supports and insulators are more particularly intended for telephone switch-boards. They are made with central openings and annular recesses and projections, so that one can apply them to a bolt. When two insulators are put side by side lateral grooves maintain the conductors in their places, and bosses upon the brackets fit into the insulators beneath.

13,817.—A CALCULATING MACHINE: *J. Vermehren.*—The instrument is intended for the processes of multiplication, division, squaring, and calculating by means of logarithms. Two discs and two operating counters, which are carried by screw-threaded or lengthwise-adjustable spindles, are thus set in engagement with friction discs mounted upon other spindles, the latter spindles being worked either separately or together with a clutch and handle. The former spindles may be stationary, their discs constituting nuts that are joined to the counting mechanism. Further counters are joined to the other discs for making logarithmical calculations. Various modifications of the invention are specified.

13,839.—FILAMENTS FOR INCANDESCENT ELECTRICAL LAMPS: *B. M. Drake and Nernst Electrical Light, Limited.*—The filaments are fashioned with a flat, oval, rectangular, star, or pinion section, so that their surfaces shall be large in ratio to their sectional areas; they are composed of a paste of some refractory substance, and are hardened by being passed through an electrical arc.

13,896.—MANUFACTURE OF BLOCKS, &c., OF ARTIFICIAL STONE: *Soc. H. Croizier et Cie.*—The moulded blocks are hardened with steam pressure. A piston-rod or shaft, which can be lifted and lowered with a hydraulic cylinder, carries shelves or platforms upon which the blocks are laid. When the shelves have been loaded they are raised into a bell, on to the flange of which the lowest platform or shelf is bolted. After the articles have been hardened by steam admitted into the bell, the piston is lowered for a re-loading of the shelves.

13,898.—A BASE OR SUPPORT FOR POSTS, POLES, &c.: *L. K. Forsythe.*—A support for fencing-posts, telegraph, telephone, and electrical conductors, and so on, consists of horizontal blocks of concrete, stone, &c., which are tied with bolt-rods to an upright block fitted with flat or angle-iron binding-strips and staying-rods, the post being fastened with bolts to the strips—the strips may be replaced with a tanged metal socket at the top of the upright block.

13,919.—PROCESS OF MOULDING BRICKS AND TILES: *T. C. Fawcett, Ltd., and J. W. Bottomley.*—For making bricks and tiles having recesses. The plungers are provided with loose frames which springs press outwards, the slotted sides of the frames slide upon screws or stop-pins in the plunger; for a screw press is contrived a friction driving-mechanism which can be automatically thrown out of working, as the pressing-plunger rises to the top of its stroke, by means of a friction disc which is recessed at its middle, a clutch and a forked lever worked by hand in one direction at the beginning of the pressing action move a shaft lengthwise from one position to another, friction-discs are mounted upon the shaft, and the movement is continued by a balanced lever which impinges against a stopping-piece when the plunger has completed its stroke downwards.

13,931.—A VENTILATOR AND DOWN-DRAUGHT PREVENTER: *H. Brown.*—A set of inclined plates is disposed over the top of the fire so that their lower edges shall lie upon a crossbar and their upper ends upon rods that are held in slots in the outer casing of which the top consists of additional inclined plates; the lower plates divert products of combustion through side-spaces to outlets and thence to the flue, the down-draught being directed by all the plates through inner spaces to those outlets. For chimney-tops, the openings in the casing communicate with the outer air, and are turned away from the direction of the wind.

13,942.—SPIGOT-AND-SOCKET JOINTING AND PIPE-COUPLING: *W. Vanderman.*—A coupling-piece for waste, sewer, and other pipes is made of two portions which are screwed together internally and are then packed. The inventor claims that the device will facilitate repairing and plumbing operations.

13,947.—MANTLE HOLDERS FOR INCANDESCENT LAMPS: *G. Birch.*—The mantle holder is detachable, and supplies an incombustible socket for the mantle-rod whilst allowing air to flow to the lower edge of the mantle. It has a ferrule that fits over the head of the burner; a pierced flange which serves as a guard for the lower edge of the mantle; and a mantle-rod socket, with its lugs fastened either between lugs upon the ferrule and a lower ring, or between lugs on the ferrule and lugs upon a ring placed above.

MEETINGS.

FRIDAY, NOVEMBER 29.

Architectural Association.—Mr. Arnold Mitchell on "Capitals," with lantern views. 7.30 p.m.

SATURDAY, NOVEMBER 30.

Dundee Institute of Architecture.—Paper by Mr. W. M. Page, entitled "Notes on Art." 7 p.m.

MONDAY, DECEMBER 2.

Royal Institute of British Architects.—Business meeting.—1. To announce the results of the November examinations. 2. Election of candidates for membership. 3. Mr. Lacy W. Ridge to move:—"That the Royal Institute of British Architects desires to thank the Local Government Board for the issue of 'Model By-Laws, IV. (Rural Districts)' While doing so the Royal Institute would urge on the Board the desirability of preparing a model to enable Rural District Councils to regulate party-walls as distinct from external walls, a matter for which the Urban Model By-Laws, to which the Board refer them, are not available. The Institute ground this on the belief that the existence of properly constructed party-walls has proved an efficient barrier to the spread of fire, and that it is undesirable that such protection should be withdrawn in places where it has already existed." 4. Mr. Herbert W. Wills to move:—"That in the interests of the profession it would be advisable to have a list of 'Institute Assessors' drawn up, from which the President would nominate, and that this list be from year to year revised." 8 p.m.

London Institution.—Mr. A. W. Clayden, M.A., on "Photographic Study of Clouds," illustrated. 5 p.m.

Society of Engineers.—Mr. H. Alfred Roechling, C.E., on "The Sewage Question during the last Century." 7.30 p.m.

Liverpool Architectural Society.—Mr. C. E. Bateman on "Castle Bromwich Church," illustrated with limelight views. 6 p.m.

TUESDAY, DECEMBER 3.

Institution of Civil Engineers.—Paper to be further discussed, "Train Resistance," by Mr. John A. F. Aspinall, M.Inst.C.E. 8 p.m.

WEDNESDAY, DECEMBER 4.

Royal Archæological Institute.—Mr. Alfred C. Fryer, Ph.D., F.S.A., on "Fonts with Representations of the Seven Sacraments." 4 p.m.

British Archæological Association.—Mr. A. R. Goddard, B.A., on "The Underground Strong-Room at Richborough, Kent." 8 p.m.

Society of Arts.—Mr. H. Stone on "The Identification of Wood and its Application to Scientific and Commercial Purposes." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Edinburgh Architectural Association.—(Associates' Paper). Mr. J. Ednie on "The Applied Art of To-Day and Yesterday." 8 p.m.

FRIDAY, DECEMBER 6.

Architectural Association Discussion Section.—Mr. S. Perks on "The Ethics of Dilapidations." 7.30 p.m.

Institution of Junior Engineers. (Westminster Palace Hotel).—Paper on "Street Railway Construction for Electric Traction," by Mr. F. S. Pilling. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. R. W. A. Brewer on "Gas-Engine Construction." 8 p.m.

Birmingham Architectural Association.—Mr. H. H. Statham on "The Architectural Treatment of Bridges."

Glasgow Architectural Craftsmen's Society.—Mr. C. Ernest Monro on "Hotel Planning and Construction." 8 p.m.

SATURDAY, DECEMBER 7.

British Association of Waterworks Engineers.—Winter meeting of the Association, to be held at the Geological Society's Rooms, Burlington House, London.—1. Ballots for the Council and Officers for 1902-3, and for new members and Associates. 2. Discussion on Mr. Ingham's paper, entitled "The Design, Construction, and Cost of Open and Covered Service Reservoirs." 3. Paper, entitled "French Practice in the Manufacture of Cast-Iron Pipes," by Mr. A. G. Cloake. 4. Paper, entitled "English Practice in the Manufacture of Cast-Iron Pipes," by Mr. S. H. Terry, M.Inst.C.E. 5. An abstract, entitled "American Practice in the Manufacture of Cast-Iron Pipes" (from the *Engineer*), will be taken as read. 6. Discussion on the three papers above mentioned. 10.30 a.m.

British Institute of Certified Carpenters.—Annual general meeting, Carpenters' Hall. 6 p.m.

City of London College Science Society (White-street, Moorfields, E.C.).—Visit to the works of the Baker-street and Waterloo Railway, by permission of the contractors, Messrs. Perry & Co.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 12.—By FULLER, HORSEY, SONS, & CASSELL (on premises).

Battersea.—Wickersley-rd., site of the Pays Bas Chemical Works, area 62,700 ft., f.	£5,570

November 13.—By G. FITT & Co. (at Norwich).

Norwich.—St. Gile's-rd., the Plantation and 2 a. 3r. 0 p., u.t. 29 yrs., g.r., &c., 31*l.* 15s.	1,000
Brundall, Norfolk.—Riversdale House and 6a. 2r. 25 p., f.	1,200

November 14.—By WEATHERALL & GREEN (at Hastings).

Hastings, Sussex.—Sedlescombe-rd., &c., twenty-five freehold building plots	1,518

By A. BROMLEY SANDERS (at Exeter).

Stokenham, &c., Devon.—The Stokeley Estate, 1,257 a. 3 r. 25 p., f.	43,000

November 15.—By H. J. WAY & SON (at Brighton).

Brighton, Sussex.—Charlton Hill, The Foresters' Arms p.h., f., r. 26*l.*	850
Edward-st., The White Horse p.h., f., r. 45*l.*	1,125
Edward-st., The Plasterers' Arms p.h., f., r. 50*l.*	1,275
20, Edward-st., f., r. 16*l.*	425
8, 9, and 10, Rock-pl., f., r. 48*l.*	620

November 18.—By FAREBROTHER, ELLIS, & Co.

Hampstead.—12, Frognal, f.	4,500
City of London.—24, Cullum-st., f.	3,300

By FIELD & SONS.

Southwark.—105, Park-st., f., r. 40*l.*	630
Plaistow.—Milton-rd., f.g.r. 2*cl.*, reversion in 79 yrs.	480

By J. H. BETHELL (at Forest Gate).

Manor Park.—Clavering-rd., &c., 50 plots of freehold building land (in lots)	3,282

November 19.—By W. ASHMOLE.

Dagenham, Essex.—Crown-st., freehold house, shop, and baker's premises with goodwill	1,265
Crown-st., 4 freehold cottages	355
Crown-st. (rear of), two freehold cottages and block of building land	385

By Beard & Son.

Bayswater.—111, Cornwall-rd., u.t. 63 yrs., g.r. 10*l.*, r. 56*l.* £525
115, Cornwall-rd., u.t. 63 yrs., g.r. nil, r. 35*l.* .. 700
Paddington.—200, 202 and 204, Harrow-rd., u.t. 48½ yrs., g.r. 25*l.*, r. 185*l.* 1,430

By David Burnett & Co.

Mayfair.—77, Grosvenor-st., u.t. 15½ yrs., g.r. 44*l.*, r. 350*l.* 3,000

By E. H. Henry.

Clapham.—Vernon-road, Claremont, u.t. 96¼ yrs., g.r. 8*l.* 10s., e.r. 50*l.* 425
Stockwell.—94, Willington-rd., f., e.r. 45*l.* 550
21, Hubert-grove, u.t. 73½ yrs., g.r. 6*l.* 6s., r. 32*l.* 345

By Weston & Sons.

Bushey, Herts.—Bourne Hall-rd., Tynecote and Bourne Hall Cottage, f., r. 64*l.* 1,080
Camberwell.—23 to 35 (odd), Westhall-rd., u.t. 62 yrs., g.r. 30*l.* 12s., r. 247*l.* 1,450
Croydon.—102 and 104, Southbridge-rd., f., r. 53*l.* 6s. 875

Woods & Snelling.

Orpington, Kent.—Copper Beeches and 2¼ acres, f. 1,500
Edmonton.—1 to 5, Ann's Cottages, f. 540

Matthew Miles (at Masons' Hall Tavern).

Aldgate.—Church-row, the Bell p.h., u.t. 10 yrs., r. 100*l.*, with goodwill 750

November 20.—C. P. Whitelry.

Whitechapel.—8, 9, and 10, St. Mark's-st., f., r. 150*l.* 3,360
St. Mark's-st., the Scarborough Arms p.h., f., r. 70*l.* 2,220
6 and 7, St. Mark's-st.; 1 to 27 (odd), Scarborough-st.; and 1, Tenter-st. West, f., r. 300*l.* 8,600
Clerkenwell.—61A, 61, 62, and 63, St. John's-square, area 3,780 ft., f., r. 13 *l.* 4,150

By Hibbard & Whittingham.

Westbourne Park.—107, Cornwall-rd., u.t. 63 yrs., g.r. 10*l.*, r. 75*l.* 930

By Henry Holmes & Co.

Highgate.—34, Cromwell-av., u.t. 69 yrs., g.r. 9*l.*, r. 42*l.* 435

By T. H. Martin & Co.

Dalston.—23, Sandringham-rd., u.t. 64 yrs., g.r. 7*l.*, e.r. 60*l.* 540

By Alfred Richards (at Shanklin).

Shanklin, Isle of Wight.—Devonshire-villas, i.g.r. 30*l.*, u.t. 959 yrs., g.r. nil 665
The Esplanade, i.g.r.'s 30*l.*, u.t. 959 yrs., g.r. nil. 660

By E. Holsworth (at Peckham).

Peckham.—20, Tyrrell-rd., u.t. 75 yrs., g.r. 7*l.*, r. 30*l.* 250

By C. C. & T. Moore.

Fleet-st.—47, Fetter-lane, f., r. 50*l.* 1,400
Wanstead.—1 to 13 (odd), Sydney-rd., f. 1,520
Commercial-rd. East.—No. 327, u.t. 36 yrs., g.r. 30*l.*, e.r. 100*l.* 455
West Ham.—103, Vicarage-lane, u.t. 78 yrs., g.r. 6*l.* 10s., r. 40*l.* 385

By Newbon, Edwards, & Shephard.

Highbury.—33, 35, and 37, Bryantwood-rd., u.t. 62 yrs., g.r. 13*l.*, r. 124*l.* 1,360
Bethnal Green.—37, 39, 41, 43, and 53, Hartley-st., u.t. 24½ yrs., g.r. 15*l.* 700
Camden Town.—8, Torriano-avenue, u.t. 42½ yrs., g.r. 5*l.*, r. 52*l.* 8s. 400
Stamford Hill.—80 and 82, St. Ann's-rd., u.t. 73 yrs., g.r. 13*l.*, r. 66*l.* 455
Stoke Newington.—26, Spenser-rd., f., r. 31*l.* 4s. .. 405

By Stimson & Sons.

Hackney.—55, 57, and 59, Warner-pl. and 56, St. Peter-st.; also the East London Saw Mills, u.t. 40 yrs., g.r. 100*l.*, r. 350*l.* 1,375
Peckham.—Denman-rd., a plot of building land, f. 330
Walworth.—35 and 37, South-st., f. 670
Croydon.—65, Lower Addiscombe-rd., f., e.r. 75*l.* .. 750
Brixton.—62, Knowle-rd., u.t. 60½ yrs., g.r. 6*l.*, r. 43*l.* 355
Bermondsey.—68, Galley Wall-rd., u.t. 33 yrs., g.r. 5*l.*, r. 52*l.* 425
Southend, Essex.—Cliff Town Parade, f.g.r. 24*l.* 10s., reversion in 56 yrs. 825
West Cliff Parade, i.g.r. 18*l.* 9s. 10d., u.t. 56½ yrs., g.r. nil. 380

By Hooker & Webb (at Croydon).

Croydon.—Bensham-lane, Littlecot, f., r. 34*l.* 600
Bensham-lane, Mann's Field (residence) and 3 a. 1 r. 9 p.; also f.g.r. 8*l.*, reversion in 59 yrs. 4,100

November 22.—By Drivers (Holloway).

Wood Green.—Tower-ter., moiety of f.g.r. 22*l.* 5s., reversion in 74 yrs. 505
Coburg-rd., f.g.r. 5*l.*, reversion in 62 yrs. 155
Hampstead-road.—79, William-st., u.t. 21 yrs., g.r. 7*l.*, r. 44*l.* 250
95, Drummond-st., u.t. 15 yrs., g.r. 7*l.*, r. 20*l.* .. 115
14, Rutland-st., u.t. 35¾ yrs., g.r. 4*l.*, r. 54*l.* 645
Islington.—31, Theberton-st., u.t. 26 yrs., g.r. 7*l.*, r. 44*l.* 340
Hoxton.—142, East-rd., u.t. 17 yrs., g.r. 10*l.*, r. 26*l.* 8s. 160

By H. N. Newton & Co.

Bethnal Green.—208, Old Ford-rd., u.t. 45 yrs., g.r. 4*l.*, r. 26*l.* 285

By A. Prevost & Son.

Bromley-by-Bow.—22 and 24, Chiltern-rd., u.t. 61 yrs., g.r. 7*l.* 570
Woodford.—Maybank-rd., f.g.r.'s 16*l.*, reversion in 80 yrs. 400

By Robert Reid.

Marylebone.—6 Ridinghouse-st., with factory premises and yard, area 6,643 ft., u.t. 14½ yrs., g.r. 45*l.*, r. 300*l.* 2,150
Oxford-st.—63, Berwick-st., f., r. 100*l.* 2,900

By A. J. Sheffield.

Somers Town.—73, Stibbington-st., u.t. 47 and 43 yrs., g.r. 5*l.*, r. 55*l.* 610
Bromley-by-Bow.—22 to 28 (even), Edgling-rd., u.t. 60½ yrs., g.r. 12*l.* 4s. 630
Manor Park.—52, Morris-av., f. 350

By E. & S. Smith.

Pentonville.—55, Pentonville-rd., u.t. 8 yrs., g.r. 12*l.* 6s., r. 91*l.* 210

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 12 0	per 1,000 alongside, in river
Rough Stocks and Grizzles	1 10 0	" "
Facing Stocks	2 12 0	" "
Shippers	2 8 0	" "
Flettons	1 8 0	" at railway depôt.
Red Wire Cuts	1 13 0	" "
Best Fareham Red	3 11 0	" "
Best Red pressed Ruabon Facing.	5 5 0	" "
Best Blue Pressed Staffordshire	4 6 6	" "
Do., Bullnose	4 10 0	" "
Best Stourbridge Fire Bricks	4 4 0	" "
Glazed Bricks		
Best White and Ivory Glazed Stretchers	13 0 0	" "
Headers	12 0 0	" "
Quoins, Bullnose, and Flats	17 0 0	" "
Double Stretchers	19 0 0	" "
Double Headers	16 0 0	" "
One Side and two Ends	19 0 0	" "
Two Sides and one End	20 0 0	" "
Splays, Chamfered, Squints	20 0 0	" "
Best Dipped Salt Glazed Stretchers and Headers	12 0	" "
Quoins, Bullnose, and Flats	14 0 0	" "
Double Stretchers	15 0 0	" "
Double Headers	14 0 0	" "
One Side and two Ends	15 0 0	" "
Two Sides and one End	15 0 0	" "
Splays, Chamfered, Squints	14 0 0	" "
Seconds Quality White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	7 3	per yard, delivered
Thames Ballast	6 0	" "
Best Portland Cement	32 0	per ton, delivered.
Best Ground Blue Lias Lime	25 6	" "

Note.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 12s 6d. per yard, delivered
Stourbridge Fire-clay in sacks, 28s. od. per ton at rly. dpt

STONE.

	s. d.	
Ancaster in blocks	1 11	per ft. cube, deld. rly. depôt.
Bath "	1 7	" "
Farleigh Down Bath	1 8	" "
Beer in blocks	1 6½	" "
Grinshill "	1 10	" "
Brown Portland in blocks	2 2	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 5	" "
Red Mansfield "	2 4	" "
Hard York in blocks	2 10	" "
Hard York 6 in. sawn both sides landings, to sizes (under 40 ft. sup.)	2 8	per ft. super at rly. depôt
" " 6 in. Rubbed Ditto	3 0	" "
" " 3 in. sawn both sides slabs (random sizes)	1 3	" "
" " 2 in. self-faced Ditto	0 9½	" "
Hopton Wood (Hard Bed) in blocks	2	3 per ft. cube. deld. rly. depôt
" " " 6-in sawn both sides landings	2	7 per ft. super. deld. rly. depôt.
" " " 3-in. do.	1 2½	" "

SLATES.

In. in.	£ s. d.	
20×10 best blue Bangor	11 5 0	per 1000 of 1200 at ry. dep.
" best seconds "	10 15 0	" "
16× 8 best "	6 2 6	" "
20×10 best blue Portmadoc	10 18 0	" "
16× 8 best blue Portmadoc	6 0 0	" "
20×10 best Eureka unfading green	11 2 6	" "
16× 8 " "	6 15 0	" "
20×10 Permanent green	10 0 0	" "
16× 8 " "	5 12 6	" "

TILES.

	s. d.	
Best plain red roofing tiles	41 6	per 1,000 at rly. depôt
Hip and valley tiles	3 7	per doz. " "
Best Broseley tiles	48 6	per 1,000 " "
Hip and valley tiles	4 0	per doz. " "
Best Ruabon Red, brown or brindled Do. (Edwards)	57 6	per 1,000 " "
Do. ornamental Do.	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 9	" " "
Best Red or Mottled Staffordshire Do. (Peakes)	50 9	per 1,000 " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "

PRICES CURRENT (*Continued*).

WOOD.

Building Wood.—Yellow.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13 10 0	15 10 0
Deals: best 3 by 9	13 0 0	14 10 0
Battens: best 2½ in. by 7 in. and 8 in. and 3 in. by 7 in. and 8 in.	10 0 0	11 0 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in.	8 10 0	9 10 0
2 in. by 4½ in. and 2 in. by 5 in.	8 0 0	9 0 0
Foreign Sawn Boards—		
1 in. by 1½ in. by 1½ in.	0 10 0	more than battens.
¾ in.	1 0 0	"
Fir timber: Best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Swedish balks	2 15 0	3 0 0
Pitch pine timber (30 ft.)	3 0 0	3 10 0

Joiners' Wood.

	At per standard.	
White Sea: First yellow deals, 3 in. by 11 in.	22 0 0	23 0 0
3 in. by 9 in.	20 0 0	21 0 0
Battens, 2½ in. and 3 in. by 7 in.	15 0 0	16 0 0
Second yellow deals, 3 in. by 11 in.	17 0 0	18 0 0
" " 3 in. by 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	12 0 0	13 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	12 10 0	13 10 0
Battens, 2½ in. and 3 in. by 7 in.	10 10 0	11 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	19 0 0	20 0 0
Do. 3 in. by 9 in.	16 0 0	17 0 0
Battens	12 10 0	13 0 0
Second yellow deals, 3 in. by 11 in.	14 0 0	15 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	11 0 0	12 0 0
Third yellow deals, 3 in. by 11 in.	11 10 0	12 10 0
Do. 3 in. by 9 in.	11 0 0	12 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	13 10 0	14 10 0
" " " 3 in. by 9 in.	12 10 0	13 0 0
Battens	10 10 0	11 10 0
Second white deals 3 in. by 11 in.	12 10 0	13 10 0
" " " 3 in. by 9 in.	12 0 0	12 10 0
" " battens	9 10 0	10 10 0
Pitch pine: deals	16 0 0	18 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	32 0 0	33 10 0
Broads (12 in. and up)	2 0 0	more.
Oddments	22 0 0	24 0 0
Seconds, regular sizes	24 10 0	26 10 0
Yellow Pine Oddments	20 0 0	22 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 4 6
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2 6	0 3 0
Small " "	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 8	0 0 7
¾ in. do. do.	0 0 7	- - -
Dry Mahogany—Honduras, Tabasco, per ft. sup. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	16 0 0	20 0 0
American Whitewood Planks—Per ft. cube	0 3 0	0 3 6
Prepared Flooring—	Per square	
1 in. by 7 in. yellow, planed and shot	0 13 0	0 16 6
1 in. by 7 in. yellow, planed and matched	0 13 6	0 17 6
1¼ in. by 7 in. yellow, planed and matched	0 15 0	1 0 0
6 in. at 6d. per square less than 7 in.		
1 in. by 7 in. white, planed and shot	0 11 0	0 12 6
1 in. by 7 in. white, planed and matched	0 11 6	0 13 6
1¼ in. by 7 in. white, planed and matched	0 13 6	0 15 6
6 in. at 6d. per square less than 7 in.		

JOISTS, GIRDERS, &c.

	In London, or delivered to Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0	7 5 0
Compound Girders " "	8 0 0	9 0 0
Angles, Tees and Channels, ordinary sections	8 2 6	9 2 6
Flitch Plates	8 10 0	9 0 0
Cast Iron Columns and Stanchions, including ordinary patterns	7 0 0	8 0 0

METALS.

	Per ton, in London. £ s. d.	£ s. d.
Iron.—		
Common Bars	8 0 0	8 10 0
Staffordshire Crown Bars, good merchant quality	8 10 0	9 0 0
Staffordshire "Marked Bars"	10 10 0	- - -
Mild Steel Bars	9 0 0	9 10 0
Hoop Iron, basis price	9 5 0	9 15 0
" " galvanised	16 0 0	- - -
(* And upwards, according to size and gauge.)		
Sheet Iron, Black.—		
Ordinary sizes to 20 g.	10 0 0	- - -
" " to 24 g.	11 0 0	- - -
" " to 26 g.	12 10 0	- - -
Sheet Iron, Galvanised, flat, ordinary quality.—		
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	12 10 0	- - -
" " 22 g. and 24 g.	13 0 0	- - -
" " 26 g.	14 0 0	- - -

[*See also page 497.*

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITIONS.

Nature of Work.	By whom Required.	Premiums.	Designs to be delivered
Schools	Kirkcaldy Burgh School Board	Not stated	Jan. 15
*Infirmary or Cottage Hospital, Leigh, Lancs.	The Committee	30*l.*, 20*l.*, 10*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., Supplied by	Tenders to be delivered
Sewerage Works, Holts-lane	Clayton (Yorks) U.D.C.	S. Spencer, 344, Great Horton-road, Bradford	Dec. 3
Steel Bridge Girders	Great Western Railway Company	G. K. Mills, Paddington Station, W.	do.
Sewerage Works	Youghal U.D.C.	W. H. Hill, jun., 23, South-mall, Cork	do.
Paving Works	Heston & Isleworth U.D.C.	P. G. Packman, Surveyor, Town Hall, Hounslow	do.
Alterations, Wellington House, Bridlington	Dr. J. J. Coleman	J. Earnshaw, Architect, Bridlington Quay	do.
Additions to Schools	Royston (Yorks) School Board	J. Oldroyd, Architect, 16, Infirmary-street, Leeds	do.
Drainage Works	Cleethorpes, &c., U.D.C.	E. Rushton, Civil Engineer, Poplar-road, Cleethorpes	do.
School, Skerton	Lancaster School Board	Austin & Paley, Architects, Castle Park, Lancaster	do.
Laundry Works	Lexden (Essex) Guardians	G. H. Page, Architect, Trinity Chambers, Colchester	do.
*Stores Contracts	Great Northern Railway Company	Stores Superintendent, Doncaster	do.
Additions to Pump-room Baths	Leamington Corporation	Borough Engineer, Town Hall, Leamington	Dec. 4
Paving Works, St. Andrew's Dock, Hull	North-Eastern Railway Company	T. M. Newell, Engineer, Dock Offices, Hull	do.
Retaining Wall, South Back, Bonner's Field	Sunderland Corporation	Borough Engineer, Town Hall, Sunderland	do.
Sewers, &c., Cherryhinton	Chesterton R.D.C.	Waters & Worrall, Engineers, 2, Sydney-street, Cambridge	do.
Iron Fencing	Rathdown R.D.C.	R. M. Butler, Architect, 12, Dawson-street, Dublin	do.
Villa, Outlane, near Huddersfield	Hon. J. D. Logan	J. Berry, Architect, 9, Queen-street, Huddersfield	do.
House and Shop, Reston, near Berwick-on-Tweed	Manchester Corporation	J. L. Miller, Architect, 39, Hide-hill, Berwick	do.
Electricity Plant	Clacton U.D.C.	G. F. Metzger, Engineer, Dickinson-street, Manchester	do.
Road Works, Vista-road	Woolwich Council	A. R. Robinson, Surveyor, Town Hall Buildings, Clacton	do.
*Tar Macadam Works		Borough Engineer, Maxey-road, Plumstead	Dec. 5
Houses and Stables, Cope-street, Barnsley		Senior & Clegg, Architects, Regent-street, Barnsley	do.
Business Premises, Leg-street, Oswestry		W. H. Spaull, Architect, The Gables, Oswestry	do.
Alterations to Club, Burton-lane, York		Secretary, Bootham-crescent, York	do.
Bridge Work, Pershore-road	Birmingham Corporation	J. Price, Civil Engineer, Council House, Birmingham	do.
Bridge Works, Gasworks-street	Huddersfield Corporation	Borough Engineer, Town Hall, Huddersfield	do.
Additions to Polytechnic, Selhurst-road, S. Norwood	Croydon Town Council	E. Mawdesley, Town Hall, Croydon	Dec. 6
Additions to Business Premises, Queen's-road	Halifax Industrial Society	M. Hall, Architect, 29, Northgate, Halifax	do.
Granite Setts	Northampton Corporation	W. I. Brown, Borough Surveyor, Guildhall, Northampton	Dec. 7
Additions to Schools, Annfield Plain		G. G. Wilson, Architect, 121, Durham-road, Blackhill	do.
Works at Schools, Park-street	Blaenavon (Mon.) School Board	Lansdowne & Griggs, Architects, Newport, Mon.	do.
Additions, Power Station	Huddersfield Corporation	Borough Engineer, Town Hall, Huddersfield	do.
Sewerage Works, Thornton-le-Moor	Thirsk R.D.C.	Fairbank & Son, Civil Engineers, 13, Lendal, York	do.
Paving Works, Barn-street	Church (Lancs) U.D.C.	Surveyor, Council Offices, Church	do.
Partitions, &c., Forge Side Schools	Blaenavon (Mon.) School Board	Lansdowne & Griggs, Architects, Newport, Mon.	do.
*Mansions for Working Men, Hull	London County Council	Gelder & Kitchen, Architects, 76, Lowgate, Hull	Dec. 9
*New Bandstand at Highbury Fields		Architect's Department, County Hall, Spring Gardens, S.W.	do.
Road Works, New Brompton, Kent	Bridgend (Glam.) U.D.C.	W. I. Groombridge, 177, Balmoral-road, New Brompton	do.
Sewerage Works	Llanelly Harbour Commission	M. Williams, Engineer, Station-road, Bridgend	do.
Two Timber Jetties	Ystradyfodwg School Board	H. W. Spowart, Harbour Offices, Llanelly	do.
Schools, Bodringallt (Wales)	Wolverhampton Corporation	J. Rees, Architect, Pentre	do.
Ice Factory, Wulfruna-street	Hale (Cheshire) U.D.C.	G. Green, Borough Engineer, Town Hall, Wolverhampton	do.
Road Works, Cambridge-road	Bideford Guardians	F. J. Lobley, Civil Engineer, Council Offices, Hale	do.
Villa, Myrtlefield, near Belfast	Beckenham U.D.C.	W. J. Fennell, Architect, 2, Wellington-place, Belfast	do.
Infirmary	Erith U.D.C.	R. T. Hookway & Son, Architects, Bideford	do.
Alterations to Eden Theatre, Bishop Auckland	Middlesex County Council	F. H. Livesay, Architect, Bishop Auckland	do.
*800 cube yards of 1½-inch Quartzite	London County Council	The Surveyor, Beckenham	do.
*Electric Light Station	Barking Town U.D.C.	W. Egerton, 12, Queen's-road, Erith	do.
*Additions to Polytechnic, Bedford Park	West Ham Council	H. T. Wakelam, Architect, Guildhall, Westminster, S.W.	do.
*Maisonette Houses, Wandsworth	Lambeth Guardians	F. & W. Stocker, 90, Queen-street, Cheapside, E.C.	Dec. 10
*Superstructure of Three Blocks of Artisans' Dwellings	Fulham Council	Architect's Department, Housing Branch, 18, Pall Mall East, S.W.	do.
*Portable Floor to Public Baths	Nottingham Corporation	C. F. Dawson, Public Offices, Barking	do.
*Making-up Street	Bakewell (Derbyshire) R.D.C.	Borough Engineer, Town Hall, West Ham, E.	do.
*Boundary Wall at Norwood Schools	Chesterfield R.D.C.	Guardian's Offices, Brook-street, Kennington-road, S.E.	Dec. 11
*Making-up and Paving Streets	Guy's Hospital	C. Botterill, Borough Surveyor, Town Hall, Fulham	do.
*Stores and Materials for 12 months	Hornsey U.D.C.	City Engineer, Nottingham	Dec. 12
Water Supply Works	Tywardreath (Cornwall) Sch. Bd.	Sterling & Swama, Engineers, Town Hall, Chapel-en-le-Frith	Dec. 13
Reservoir, Bar Brook, Totley	Bury (Lancs) Corporation	R. E. Hartwright, Union Offices, Chesterfield	do.
Supplies for 12 months	Hendon R.D.C.	Superintendent	Dec. 14
School, Alnwick	Reading Corporation	J. W. Douglas, 40, Bondgate, Alnwick	do.
Brick Outfall Sewer, Stoneware Pipe Sewer, &c	Middlesex County Council	E. J. Lovegrove, Engineer, Southwood Lane, Highgate, N.	Dec. 16
Schools	Leeds Corporation	J. Cook, Tywardreath, Cornwall	Dec. 17
Sewage Disposal Works	Manchester Corp. Waterworks	A. W. Bradley, Engineer, Town Hall, Bury	do.
*Isolation Hospital, Great Stanmore	Newcastle-on-Tyne Co-op. Soc., Ld	J. A. Webb, Surveyor, Great Stanmore	Dec. 18
*Erection of Buildings for Electrical Power Station		Borough Engineer, Town Hall, Reading	Dec. 21
*New Bridge across River Ash at Littleton	Messrs. Powolny, Ltd.	H. T. Wakelam, County Engineer, The Guildhall, Westminster	Dec. 31
*Extension of Seacroft Hospital	Bleaching Company	The City Engineer, Leeds	Jan. 4
*Laying Second Line of Pipes, Thirlmere Aqueduct	Ampthill R.D.C.	G. H. Hill & Sons, 3, Victoria-street, Westminster, S.W.	Jan. 7
Stabling, &c., West Blandford-street	Brewery Company, Limited	F. E. L. Harris, Architect, 1, Balloon-street, Manchester	No date
Additions to Hunters Inn, Hedsmouth, N. Devon		T. H. Watson & Son, Architects, 9, Nottingham-place, W.	do.
Restaurant and shop, King Edward-street, Hull	Mr. A. E. Wilson	A. Neill & Son, Architects, 38, Park-row, Leeds	do.
Reservoir, Harwood Vale, near Bolton	Mrs. T. A. Edmunds	J. Sellers & Son, Architects, Union Chambers, Bury	do.
Sinking Well, Longslade Lane, Woburn	H. N. Falkner, Esq.	D. Balfour & Son, Civil Engineers, 1, Victoria-street, S.W.	do.
Brewery, Keighley Green, Burnley	A. B. H. Goldschmidt, Esq.	C. Riley, Architect, St. James' Hall, Burnley	do.
Four Houses, Bolton Abbey, Yorks.	Watford School Board	J. B. Bailey & Son, Architects, 3, Scott-street, Keighley	do.
Villa, Whitehead		A. E. Wilson, 22, Waring-street, Belfast	do.
Three Houses, Cemetery-road, Porth, Wales		E. Jones, Architect, Porth	do.
Erection of House, Ulting, Essex		P. M. Beaumont, Architect, Maldon, Essex	do.
Erection of Farm Buildings, Cavenham Hall, Suffolk		do.	do.
New School		J. Hunt, Architect, 40, Upper Baker-street, N.W.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
Clerk of Works	Manchester Watch Committee	3*l.* 3s. per week	Dec. 3
Main Road Surveyor	Lancashire County Council	200*l.*, &c.	Dec. 7
Outdoor Manager and Foreman	Ryde Council	2*l.* 2s. per week	do.
Positions on Unestablished Staff of Architect's Dept.	London County Council	3*l.* 3s. and 2*l.* 2s. per week	Dec. 9
Assistant Surveyor	Fulham Council	200*l.*	Dec. 10
Surveyor	Litherland U.D.C.	200*l.*	do.
Three Clerks of Works	Willesden District Council	4*l.* 4s. per week each	do.
Two Sanitary Inspectors	Bermondsey Metropolitan Boro'	130*l.* each	Dec. 13
Superintendent of Outdoor Work	Royal Borough of Kensington	250*l.*, &c.	Dec. 16
Assistant Surveyor	Hanley Corporation	150*l.*	do.
Senior Sanitary Inspector	Hampstead Council	250*l.* per annum	do.
Engineering and Architectural Draughtsmen	H.M. Dockyard, Pembroke Dock	2*l.* 14s. per week each	No date
Draughtsman	Civil Service Commission	Not stated	do.

Those marked with an asterisk (*) are advertised in the Number. *Competitions, p. iv.* *Contracts, pp. iv. vi. viii. x. & xxi.* *Public Appointments, pp. xix. & xxi.*

PRICES CURRENT (*Continued*)

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Sheet Iron, galvanised, flat, best quality.—		
Ordinary sizes to 20 g.	16 10 0	. . .
,, ,, 22 g. and 24 g.	17 0 0	. . .
,, ,, 26 g.	18 10 0	. . .
Galvanised Corrugated Sheets.—		
Ordinary sizes, 6 ft. to 8 ft. 20 g.	12 10 0	. . .
,, ,, 22 g. and 24 g.	13 0 0	. . .
,, ,, 26 g.	14 0 0	. . .
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	12 5 0	. . .
,, ,, 22 g. and 24 g	13 5 0	. . .
,, ,, 26 g.	14 5 0	. . .
Cut nails, 3 in. to 6 in. (Under 3 in. usual trade extras.)	9 10 0	10 0 0

LEAD, &c.

	Per ton, in London. £ s. d.	£ s. d
LEAD—Sheet, English, 3 lbs. & up.	14 0 0	. . .
Pipe in coils	14 10 0	. . .
Soil Pipe	17 0 0	. . .
ZINC—Sheet—		
Vieille Montagne ton	24 10 0	. . .
Silesian	24 0 0	. . .
COPPER—		
Strong Sheet per lb.	0 1 0½	. . .
Thin ,,	0 1 2	. . .
Copper nails ,,	0 1 2	. . .
BRASS—		
Strong Sheet ,,	0 0 11	. . .
Thin ,,	0 1 1	. . .
TIN—English Ingots ,,	0 1 3½	. . .
SOLDER—Plumbers' ,,	0 0 6½	. . .
Tinmen's ,,	0 0 8	. . .
Blowpipe ,,	0 0 9	. . .

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2¾d. per ft. delivered.
,, ,, fourths	2½d. ,, ,,
21 oz. thirds	3½d. ,, ,,
,, ,, fourths	3¼d. ,, ,,
26 oz. thirds	4¼d. ,, ,,
,, ,, fourths	4d. ,, ,,
32 oz. thirds	5¼d. ,, ,,
,, ,, fourths	5d. ,, ,,
Fluted sheet, 15 oz.	3¾d. ,, ,,
,, ,, 21 ,,	4¼d. ,, ,,
½ Hartley's Rolled Plate	2¾d. ,, ,,
⅜ ,, ,, ,,	3¼d. ,, ,,
½ ,, ,, ,,	3¾d. ,, ,,

OILS, &c.

	£ s. d.
Raw Linseed Oil in pipes per gallon	0 2 11
,, ,, ,, in barrels ,,	0 3 0
,, ,, ,, in drums ,,	0 3 2
Boiled ,, ,, in pipes ,,	0 3 1
,, ,, ,, in barrels ,,	0 3 2
,, ,, ,, in drums ,,	0 3 4
Turpentine, in barrels ,,	0 2 3
,, in drums ,,	0 2 6
Genuine Ground English White Lead per ton	21 10 0
Red Lead, Dry ,,	22 0 0
Best Linseed Oil Putty per cwt.	0 9 0
Stockholm Tar per barrel	1 12 0

VARNISHES, &c.

	per gallon. £ s. d
Fine Elastic Copal Varnish for outside work	0 16 6
Best Elastic Copal Varnish for outside work	1 0 0
Best Elastic Carriage Varnish for outside work	0 16 0
Best Hard Oak Varnish for inside work	0 10 6
Best Extra Hard Church Oak Varnish for inside work	0 10 6
Fine Hard Copal Varnish for inside work	0 16 0
Best Hard Copal Varnish for inside work	1 0 0
Best Hard Carriage Varnish for inside work	0 16 0
Extra Pale Paper Varnish	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
Best French and Brush Polish	0 10 0

TO CORRESPONDENTS.

W. H. J.—C. J. (Below our limit).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays.* N.B.—We cannot publish tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of tenders accepted unless the amount of the tender is given, nor any list in which the lowest tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ANNFIELD PLAIN (co. Durham).—For the execution of sewage disposal works, Dipton, for the Urban District Council. Mr. T. J. Trowsdale, surveyor, Annfield Plain:—

Joseph Dunn	£267 8 6	Samuel Dark, Annfield Plain*	£232 13 6

[Surveyor's estimate, £220 5s.]

AXMINSTER.—For the restoration of the north aisle roof of the parish church. Mr. E. H. Harbottle, architect, County Chambers, Exeter:—

Westcott, Austin, & White	£810 0	Tuscombe & Son, Ltd.	£565 0
W. Dart	799 0	Stephens & Son, Ltd., Exeter*	545 0
G. H. Lentil	654 6		
Nicks Bros.	599 0		

BARNSLEY.—For the erection of a church and schools, Wombwell. Mr. J. P. Earle, architect, Norfolk Chambers, Norfolk-road, Sheffield. Quantities by the architect:—

F. Fidler	£5,000	Taylor & Sons, Barnsley*	£4,698
C. Broadbent	4,899	J. Bishop	4,681
M. Grantham	4,708		

BROMLEY (Kent).—For erection of warehouse and forge, for Mr. C. Chitty. Messrs. Dale & Gadsdon, architects, 8, Union-court, London, E.C.:—

Lewis Evans	£798	Graty	£675
Crossley & Son	785	Arnaud & Son*	627

CARDIFF.—For additions to warehouses, Millicent-street, for Messrs. J. Isaac & Sons. Mr. E. G. C Down, architect, 31, High-street, Cardiff. Quantities by architect:—

Thomas & Co.	£570 0	Shepton & Son	£416 10
Geo. Griffiths	453 0	David Davies	405 0
Lattey & Co.	439 0	W. T. Morgan*	393 9
Knox & Wells	435 0	F. Small	390 0

[All of Cardiff.]

CHALFORD (Glos.).—For the erection of a school, Chalford Hill, for the School Board. Mr. V. A. Lawson, architect, 17, Rowcroft, Stroud:—

A. S. Cooke	£1,665 14 6	Drew Bros., Stroud*	£1,532 0 0
King & Son	1,645 0 0		
Orchard & Peer	1,590 0 0		

CLATTERBRIDGE (Cheshire). — For the erection of a fever hospital, for the Wurral Joint Hospital Board. Mr. C. O. Francis, architect, 5, Richmond-street, Liverpool. Quantities by the architect:—

E. Williams	£4,936 10 3	R. Allen	£4,550 0 0
Thomas & Sons	4,918 0 0	J. Barnes	4,356 0 0
Brown & Backhouse	4,755 0 0	Lee & Son, Higher Bebington*	4,010 0 0
J. E. Hardwick	4,700 0 0		
Forde & Co.	4,628 18 0		

DARTMOUTH.—For the erection of retaining wall, Victoria-road, and cutting road in Broad Park Field, for Lieut.-General Owen. Mr. E. H. Back, C.E., Dartmouth. Quantities supplied:—

Retaining Wall.

Robert Watts, Dartmouth*	£24 9	Edward Wills	£21 18

Cutting Road.

John Back	£120	Charles Mitchelmore, Dartmouth*	£98
Richard C. Pillar	115		

DOVER.—For the erection of an infirmary and nurses' home at workhouse, for the Guardians. Messrs. Cresswell & Newman, architects, Castle-street, Dover. Quantities by architects:—

G. Munro	£7,992 14 1	G. H. Denne	£7,674 0 0
Brisley Bros.	7,988 0 0	G. Keeler	7,655 0 0
Turner	7,965 0 0	Austen & Lewis	7,492 7 0
Tapner	7,890 0 0	W. G. Lewis	7,430 10 0
Warren	7,732 16 0	W. Bromley	7,410 0 0
Gann	7,695 0 0	Lewis & Sons	6,290 0 0

HANLEY.—For the erection of a junior mixed school, for the Hanley School Board. Messrs. Scrivener & Sons, architects:—

Bennett Bros.	£2,720	Tompkinson & Gettelley	£2,497
J. Stringer	2,683	Cornes	2,475
T. R. Yoxall	2,656	T. Godwin*	2,415
J. Bagnall	2,557		
G. Ellis	2,500		

LAINDON HILLS (Essex).—For the erection of a detached villa on the Nightingale Estate, for Mr. H. Foulger. Mr. H. G. Clark, architect, Wickford:—
C. T. Johnson, Whetstone, Middlesex* £455

LARNE (Ireland).—For the erection of chapels, boundary-walls, &c., Ballycraigy, for the Urban District Council. Mr. William Pinkston, Town Surveyor. Quantities by Surveyor:—

Girvan & Moore	£3,489 16	William McNeill, Larne*	£2,414 12
R. Calwell	3,400 0		
Heggarty & Gault	3,231 11		

LETTERKENNY.—For renovation of dwelling-house, including additions and sanitary arrangements, for Mr. Field. Mr. John M'Intyre, architect, Letterkenny:—

William Wilson	£312 0	Robert Kennedy*	£295 10

LLANDAFF (Wales).—For the execution of private street improvement works, for the Rural District Council. Mr. Jas. Holden, C.E, 35, St. Mary-street, Cardiff:—

Private Street Works at Ely.

Chas. Davies	£665 15 7	Thomas Rees, Crinallt, Ely, Glam.*	£528 2 6
J. Rich	635 1 1½		
F. Ashley	605 12 8		
J. E. Evans	596 10 1		

Private Street Works at Llandaff Yard.

Chas. Davies	£227 13 8	J. E. Evans	£189 16 6
James Rich	216 13 0¾	E. W. Rees, Whitchurch, Cardiff*	179 16 5
Jno. Rees	216 11 3		
F. Ashley	204 0 7		

LONDON.—For the erection of mortuary buildings and chapel at the northern end of Manor-place, for the Borough Council of Paddington. Mr. George Weston, Surveyor:—

B. E. Nightingale	£4,188 0
Martin, French, & Co.	3,998 10
Richards & Co.	3,462 0
Spencer, Santo, & Co., Ltd.	3,399 0
Foster Bros., Suffolk-road, Norwood Junction, S.E.*	3,397 0

LONDON.—For the new boiler-house at the Albion Brewery, Shepherd's Bush, W., for Messrs. Griggs Bros. Messrs. R. W. Andrews & Co., architects and engineers, 148 and 150, Pentonville-road, N.:—

F. R. Tozer	£521	Lyford & Sons	£471
E. Jenner	496	Canning & Mullins*	465
Speechley & Smith	471		

LONDON.—For the erection of the North Branch Library, Lillie-road, for the Fulham Borough Council. Mr. C. Botterill, C.E., Town Hall, Fulham:—

Roome & Co.	£7,500 0	Martin, Wells, & Co.	£6,440 0
Barker & Co.	6,998 0	Stimpson & Co.	6,380 0
Smith & Sons	6,997 0	H. L. Holloway	6,256 0
Spencer, Santo, & Co.	6,696 0	Foster Bros	6,196 0
R. E. Nightingale	6,635 0	Lole & Lightfoot	5,984 5
T. Bendon	6,587 0	F. G. Minter	5,891 0

LONDON.—For the erection of an iron mission church:—
W. Smith, Streatham* £204

NELSON (Lancs).—For the erection of the Whitefield Schools, for the School Board, Nelson. Mr. T. Bell, architect, Grimshawe-street, Burnley. Quantities by architect:—

Masonry.—A. Robinson, jun., Brierfield*	£5,303 0 8
Joinery.—Boothman & Sons, Nelson*	2,775 0 0
Concrete.—The Asphaltic, Limestone and Concrete Co., Birmingham*	764 1 5
Slating.—Stanworth & Son, Burnley*	547 18 3
Plumbing.—J. Hargreaves, Nelson*	512 10 0
Plastering.—Butler, Barrowford*	308 16 0
Ironfoundry.—W. Walton, Burnley*	293 18 0
Painting.—H. Nutter, Nelson*	128 1 5

PONDER'S END (Middlesex).—For the construction of two new roads on the Durant's Arbour Estate, for the Enfield and District Freehold Land Co., Limited. Messrs. Michael Faraday & Rodgers, surveyors, 77, Chancery-lane, W.C., and Ponder's End:—
E. J. Betts, Enfield Highway £1,947 17 6

PONDER'S END (Middlesex).—For the erection of cottages for the Enfield and District Land Co., Limited. Messrs. Michael Faraday & Rogers, architects, 77, Chancery-lane, W.C., and Ponder's End, Middlesex:—
Constad & Co., Edmonton £7,680

RADCLIFFE-ON-TRENT.—For the execution of sewerage works, &c., for the Bingham Rural District Council. Mr. W. H. Radford, C.E., King-street, Nottingham:—

J. F. Price	£10,214 0 0	J. Ford	£7,952 0 0
Pattinson & Sons	9,052 0 0	John Holme	7,870 15 0
T. Smart	8,966 5 6	C. E. Carden	7,792 0 0
Geo Bell	8,789 0 0	G. F. Tomlinson	7,775 0 0
Lock & Andrews	8,694 11 10	H. H. Barry	7,770 0 0
S. E. Lucas	8,636 11 0	Cope & Raynor	7,667 13 0
Amos Jenkins	8,550 0 0	Johnson & Langley	7,291 18 11
Solomon Richmond	8,442 0 0	Bower Bros., West Bridgford, Nottingham*	6,948 0 0
Grisenthwaite & Newton	8,354 0 0		
Hawkins & Co.	8,094 9 8		

SOUTHEND-ON-SEA.—For the erection of twelve houses, Avenue Estate, for Mr. W. H. Pullin. Mr. F. A. Knight, surveyor, 2, Wetherby-terrace, Earl's Court, S.W.:—

Geo. Saint	£4,800 0 0	A. Ducat	£4,080 0 0
Holdstock & Mould	4,600 0 0	H. & S. Kerry	3,809 8 0
J. W. Jones	4,499 0 0	T. Lawford	3,750 0 0
F. J. Trew	4,350 11 2	Howard & Ruffell	3,629 0 0
Matthews & Son	4,270 0 0	A. Woodiwiss	3,396 0 0

WASHINGTON (co. Durham).—For additions to the Railway Tavern. Mr. G. Stephenson, architect, 20, Collingwood-street, Newcastle:—

G. G. Manners	£1,023	T. & J. White	£887
Woodall & Wilson	976	T. Robinson	796
S. Sheriff	895		

WICKFORD (Essex).—For the extension of drains and construction of outfall works, for the Billericay Rural District Council. Mr. H. G. Clark, C.E., surveyor:—

Frank Carter	£200 0	Wilson, Border, & Co.*	£194 10

WINDSOR.—For supplying and laying 600 super yards of blue bricks, South-place, for the Town Council. Mr. E. A. Stickland, Borough Surveyor, Alma-road, Windsor:—

H. Burfoot	£281 6 0	W. H. Wheeler	£200 12 0
Butcher & Hendry	264 10 0	T. Slaughter	193 0 0
A. H. Reavell	227 0 0	Geo. Chesswas, Isleworth*	175 6 2

[Surveyor's estimate, £180.]

[*See also next page.*

LONDON SCHOOL BOARD TENDERS.

At the last meeting of the London School Board, the Works Committee submitted the following lists of tenders. Mr. T. J. Bailey is the Board's architect :—

* *Recommended for acceptance.*

ACKMAR-ROAD and BELLEVILLE-ROAD.—Repairs to furniture :—

	Ackmar-road.	Belleville-road.
H. Bouneau	£102 10 0	£50 10 0
T. Cruwys	88 19 3	33 15 11
R. H. Galbraith	75 10 8†	34 14 0
General Builders, Ltd.	69 0 0†	49 0 0
Hammer & Co., Ltd.	70 0 0*	40 14 0
London School Furniture Co.	72 3 10†	34 11 0
Waring & Gillow, Ltd.	108 3 0	53 0 0

† These contractors have quoted for 88 desks instead of 113 under item 15 of the specification.

ANERLEY COTTAGE HOMES (for Deaf Children).—Providing and fixing hot-water supplies to baths, sinks, &c., in homes and superintendent's apartments, including all taps, valves, hot-water tanks, pipes, boilers, kitchen ranges, fixing, setting ranges, painting pipes, and attendance :—

Cannon & Sons	£320 0	Price Lea & Co.	£256 0
Wippell Bros & Row	320 0	Duffield & Sons	234 10
G. Davis	278 10	Wontner-Smith, Gray, & Co.	250 0
J. Esson	262 10	Paragon Heating Co.	236 18
Wenham & Waters, Ltd.	259 11	Vaughan & Brown, Ltd.*	227 0
J. & F. May	259 0		

BASNETT-ROAD.—Enlargement—Providing three additional 60 classrooms for boys, girls, and infants; reducing one class-room on each floor and providing corridor for access to new rooms. Net enlargement—Boys, 42; girls, 42; infants, 33. Total, 117. Also providing metal-work-room :—

F. & H. F. Higgs	£3,190	General Builders, Ltd.	£3,031
Holloway Bros.	3,167	J. & C. Bowyer	2,954
Wall & Co.	3,165	Bulled & Co.	2,926
Garrett & Son	3,116	E. Triggs*	2,750
Lathey Bros.	3,087		

GLOUCESTER-ROAD—(Boys and Girls).—Providing additional heating surface and providing and fixing auxiliary boiler :—

Clark, Bunnett, & Co., Ltd.	£695 0	Palowkar & Sons	£339 0
Brightside Foundry and Engineering Co., Ltd.	517 0	Defries & Sons, Ltd.	324 0
Cannon & Sons	425 0	Turner & Co.	299 10
Stevens & Sons	360 0	Oldroyd & Co., Ltd.	285 0
		Seward & Co.*	274 0

PLUM-LANE (Graded).—Providing and fixing complete low-pressure hot-water apparatus to two halls, twelve class-rooms, drawing class-room, cloak-rooms, corridors, and lavatories :—

Wippell Bros. & Row	£699 0	Brightside Foundry and Engineering Co., Ltd.	£567 0
Cannon & Sons	679 0	Werner, Pfleiderer & Perkins, Ltd.	483 10
Harlow & Son	657 0	Skinner, Board, & Co.	462 0
Paragon Heating Co.	575 0	Stevens & Sons*	460 0

ST. JOHN'S-ROAD.—Enlargement—Providing new classrooms :—Boys', 60; girls', 60; infants', 60; altering boys' steps to entrance; removing and refixing boys' entrance in boundary wall; altering, re-stepping, and re-lighting one north classroom (boys, girls, and infants) and forming corridor as access to new room, and reducing room to 48 in boys', girls', and infants' departments; and extending boys' covered playground on roof of building. Revised accommodation :—Boys', 528; girls', 528; infants', 633 : total, 1,689. Net enlargement :—Boys', 48; girls', 48; infants', 33; total, 129 ;—

Wall & Co.	£3,414	Willmott & Sons	£2,839
Snewin, Bros., & Co.	3,241	C. Cox	2,811
Treasure & Son	3,182	L. H. & R. Roberts	2,797
F. & F. J. Wood	2,966	W. Shurmur	2,790
Dearing & Son	2,932	McCormick & Sons	2,780
Grover & Son	2,920	Clarke & Bracey	2,752
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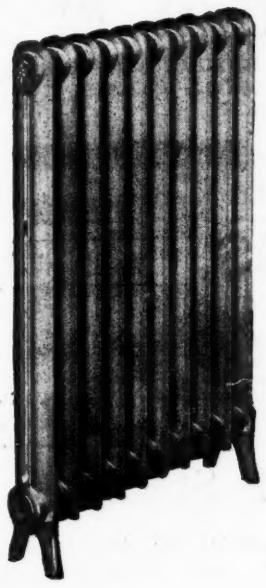

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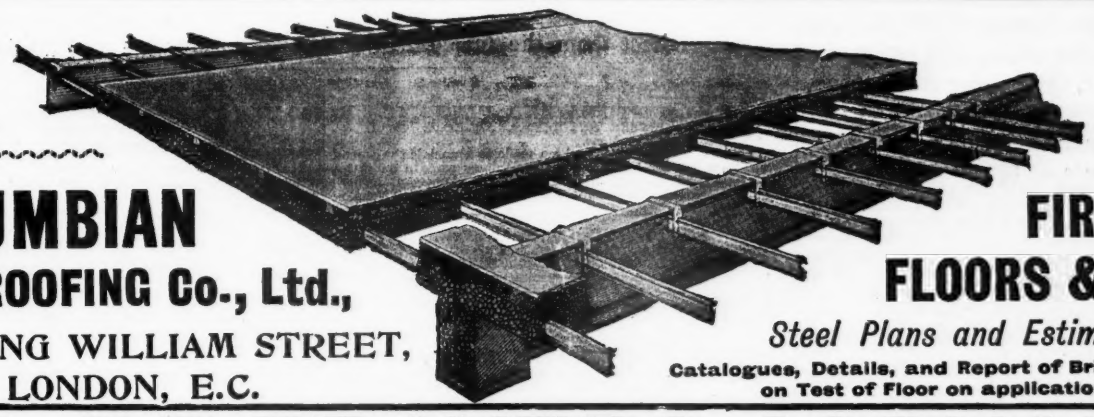

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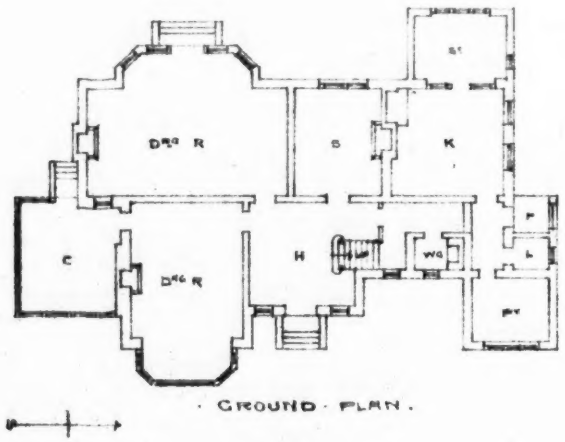

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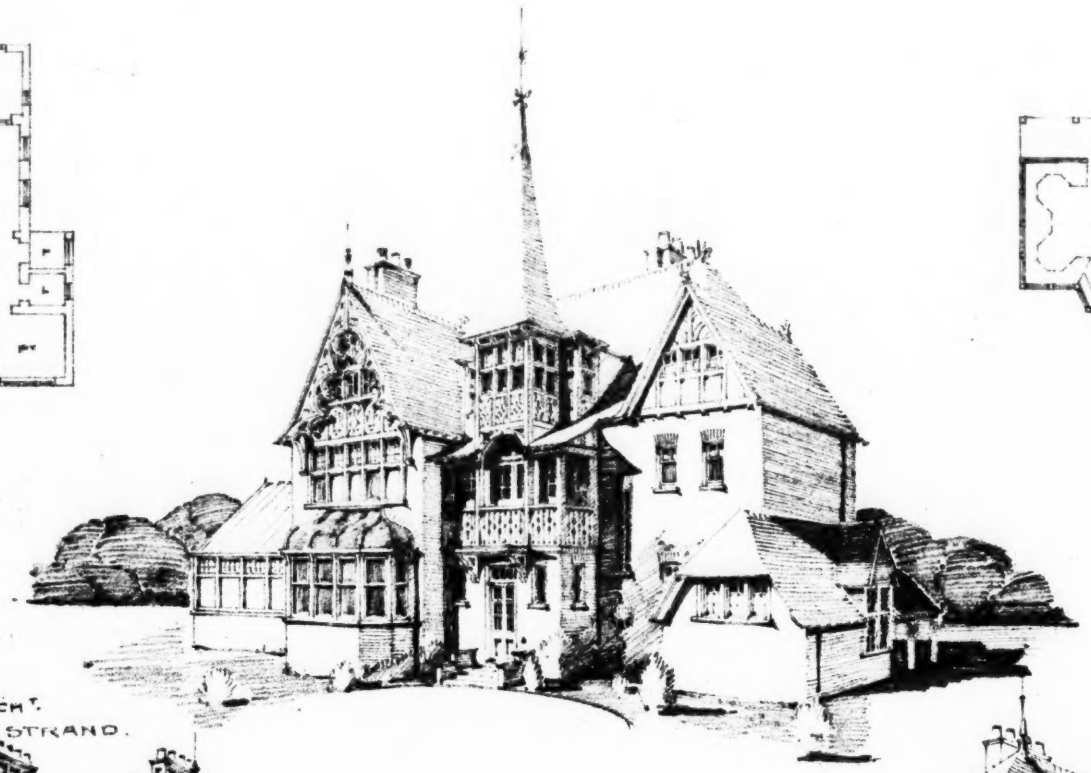

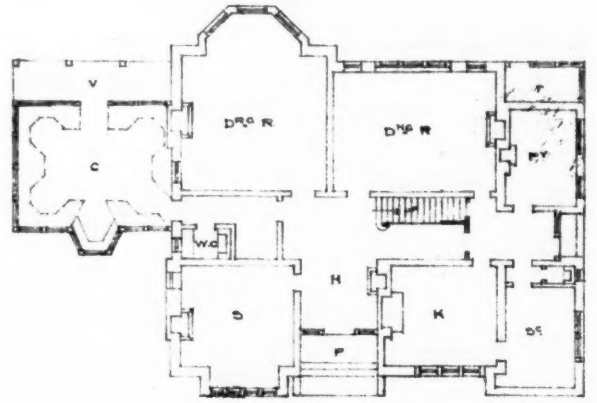

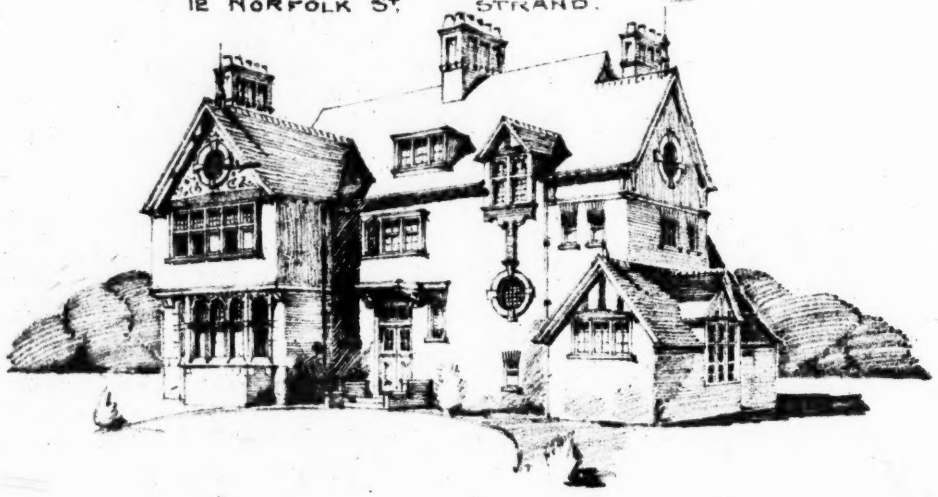

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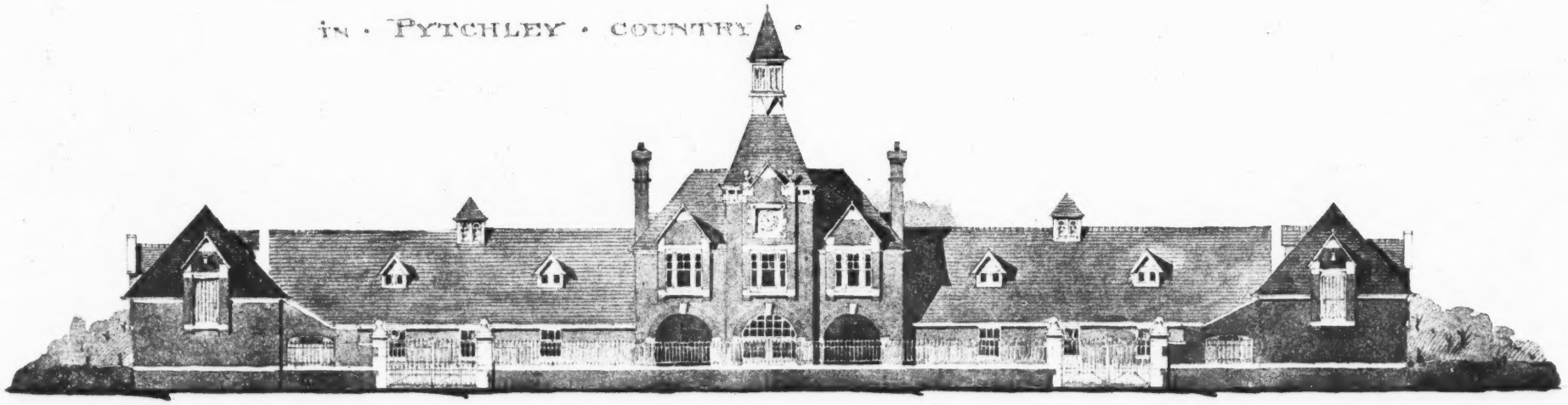

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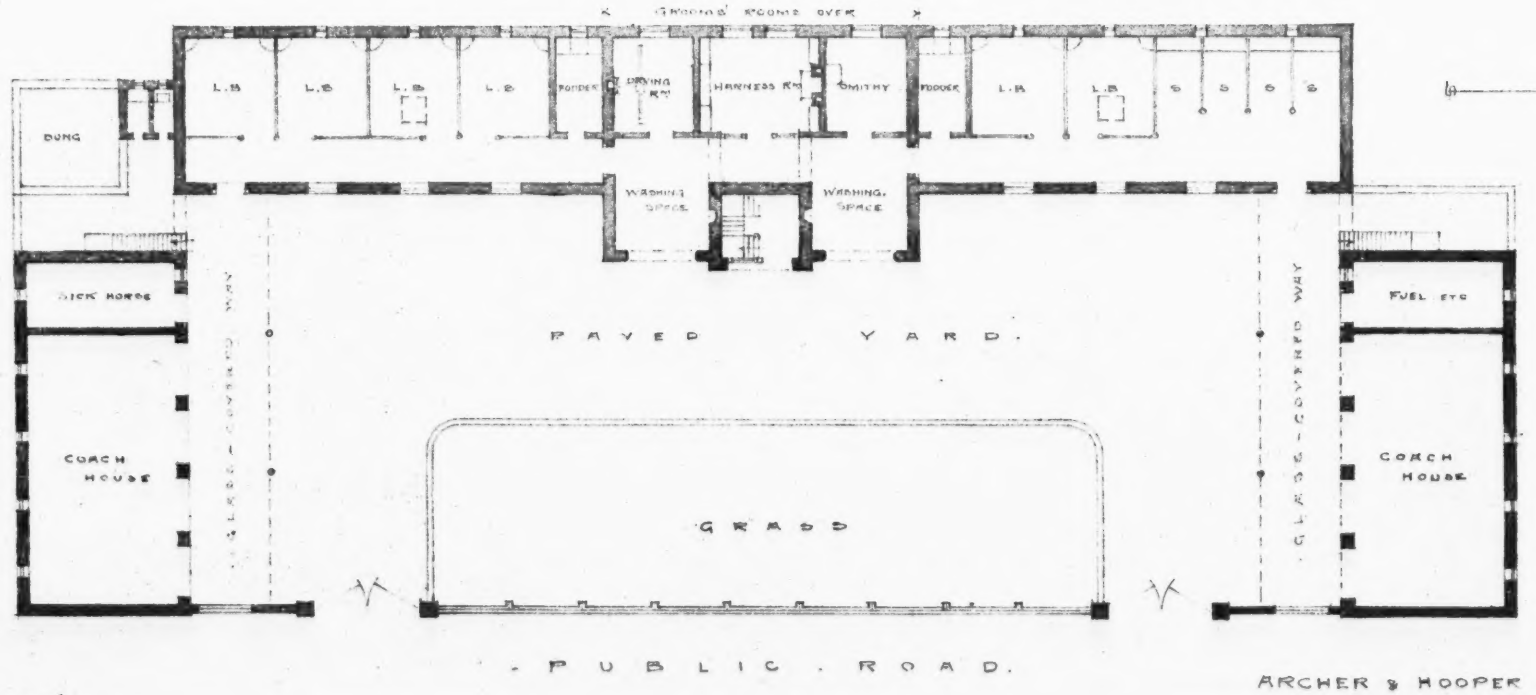

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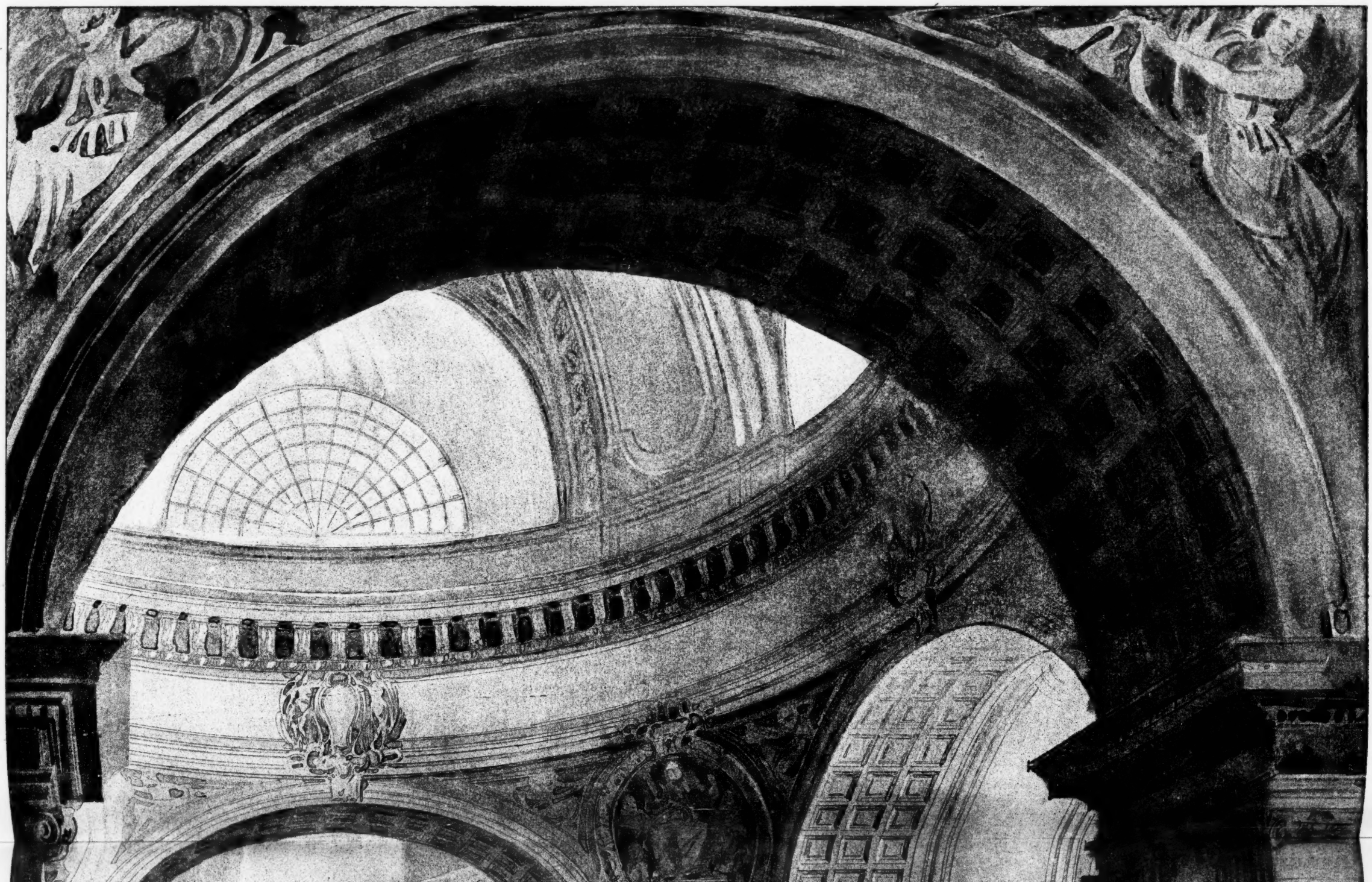

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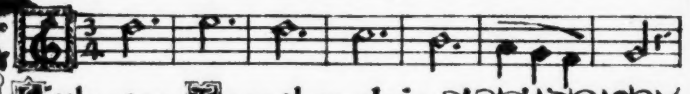
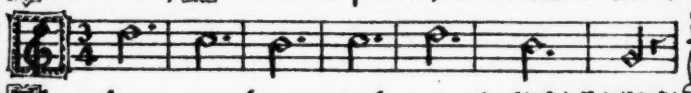
so much on Nicolette, his sweet friend, that he fell so hard upon a stone, that his shoulder flew out of place. He felt that he was much hurt; but he bestired himself as well as he could and tied his horse up with his other hand to a thorn and turned over on his side, so that he came all on his back into the bower. And he looked through a chink in the bower, and saw the stars in the sky; and he saw one there brighter than the rest, and he began to say:

Now it is sung



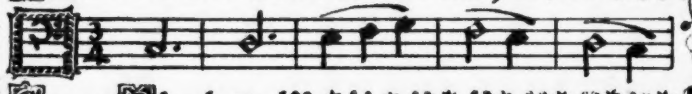
Little star, I see thee plain,



That the moon draws to her train!
Nicolette is with thee there,
My love, of the golden hair.

God, methinks, wants her in heaven,
To become the lamp of even.

However so greatly my fall might be,
Would that I were there with thee!
Closely would I kiss and cling!—
Were I son to crowned king,
Thou shouldst well become me yet,



Sweet Nicolette!"

Now they speak and they relate and they tell. When Nicolette heard Aucassin she came to him, for she was not far off. She came into the bower, and threw her arms round his neck, & kissed him and caressed him. "Fair sweet friend, well be you met!"

A DECORATIVE PAGE.—By Mr. W. H. Cowlishaw.

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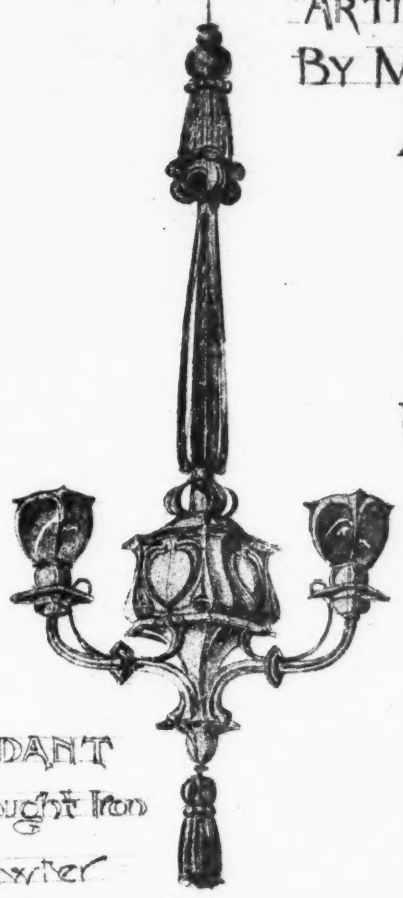
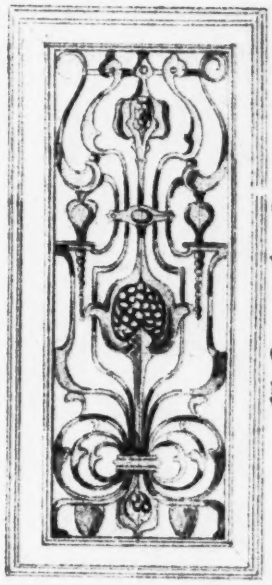
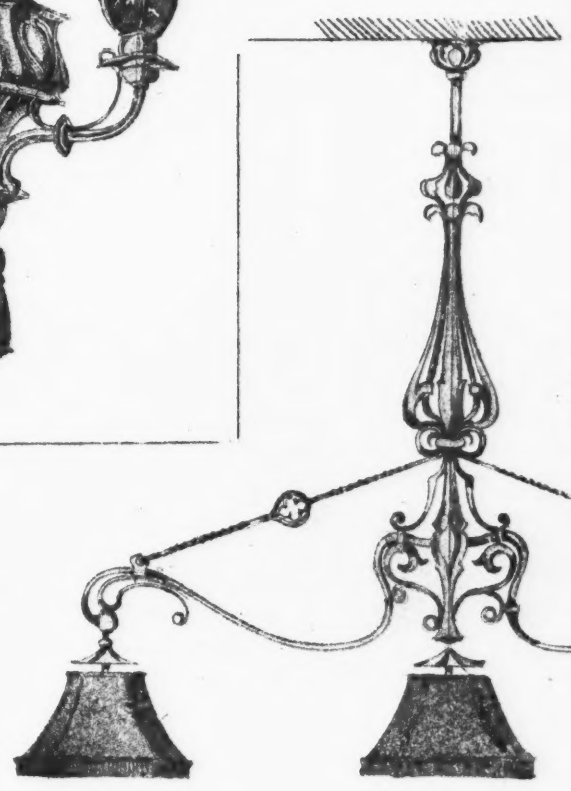


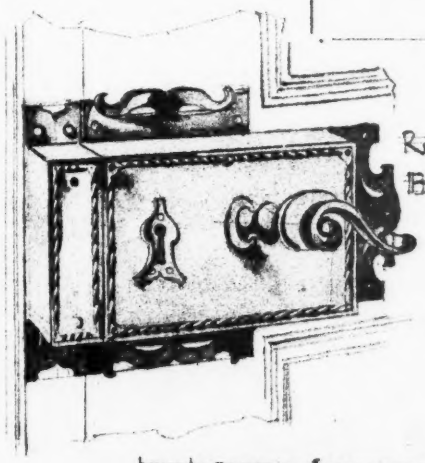
PENDANT in Wrought Iron or Pewter 4 arms



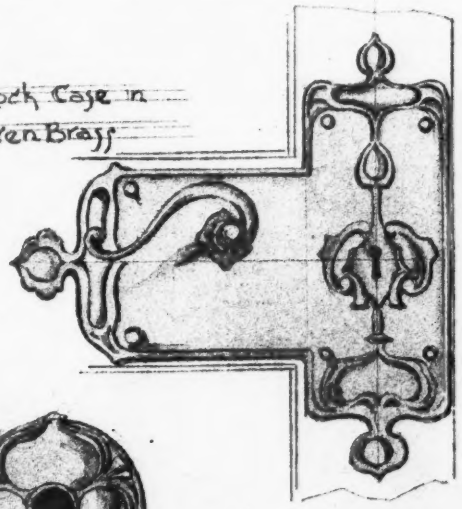
Grille in Wrought Iron & Copper or Enamel

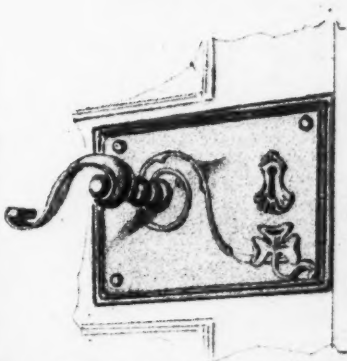


Billiard Pendant for 3 Lights For Acetylene Gas



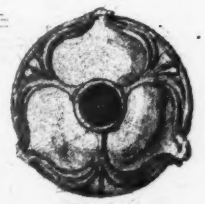
Rim Lock Case in Beaten Brass





Lock Plate in Pewter or Iron

Lock Plate in Iron



Bell Push in Bright Iron

Lock Plate in Bright Iron Embossed

Switch Cover in Beaten Copper and Enamel

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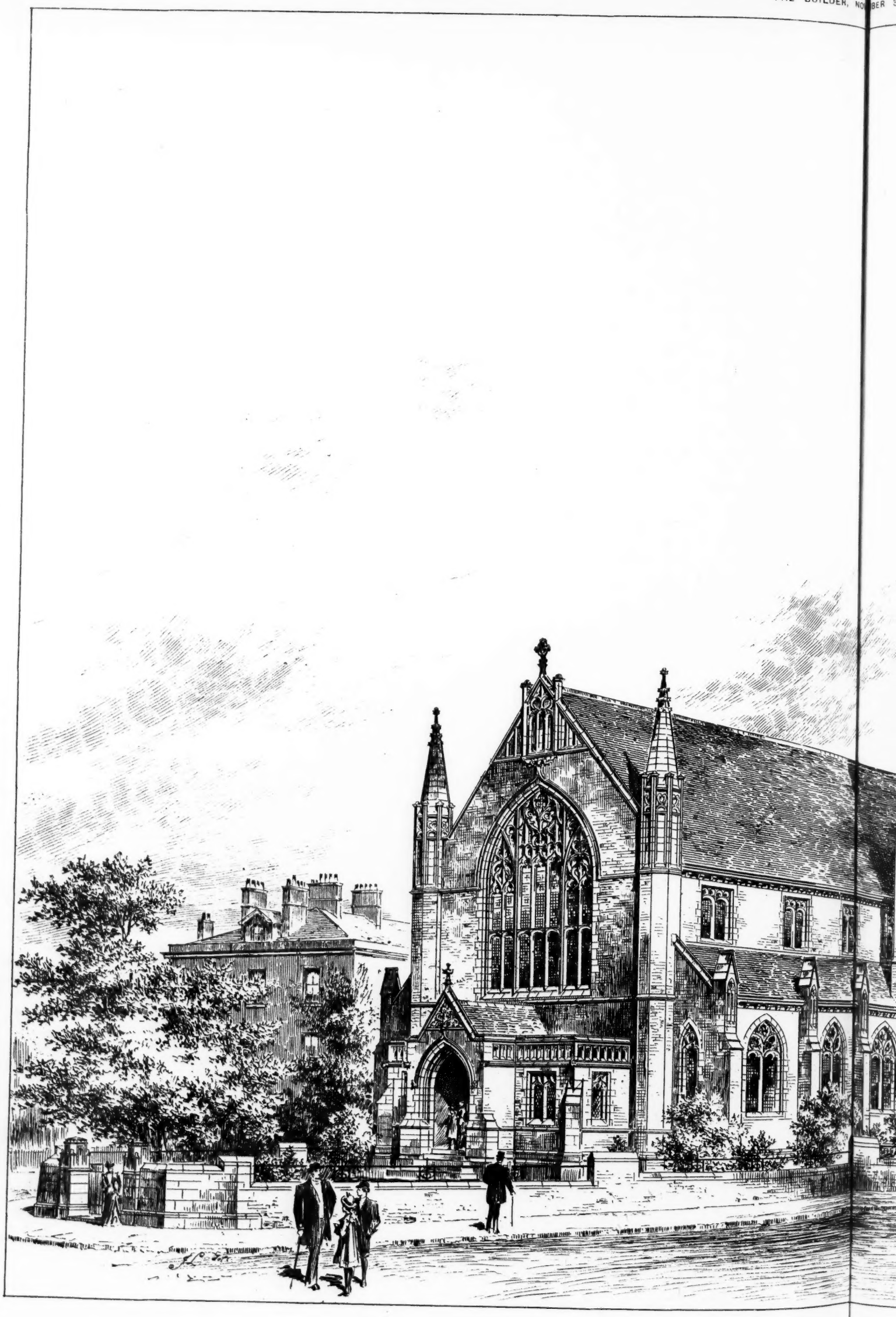

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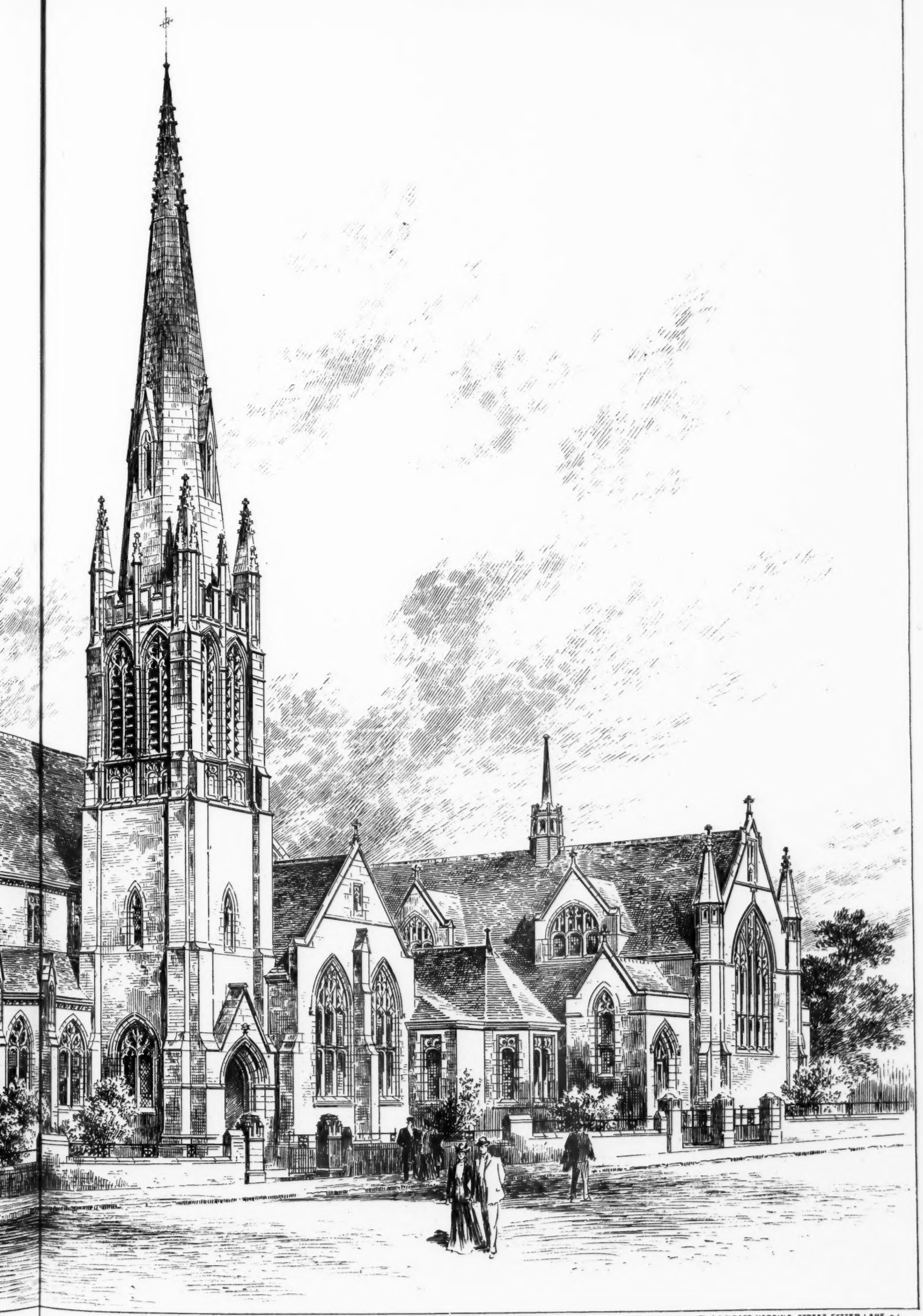

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